Santa Clara Valley Water District

2011

GROUNDWATER QUALITY ANNUAL REPORT

2011 GROUNDWATER QUALITY ANNUAL REPORT

SECTIONS

1 Introduction

2 Water Quality Indicators

3 Inorganic Parameters

4 Organic and Radioactive Parameters

5 Summary and Conclusions

6 Appendices

Prepared Under the Direction of:
James Fiedler
Chief Operating Officer, Water Utility Enterprise

Joan Maher
Deputy Operating Officer, Water Supply Division

Behzad Ahmadi
Unit Manager, Groundwater Monitoring and Analysis Unit

Contributors:
Randy Behrens
George Cook
Vanessa De La Piedra

Graphic Design (Cover and Table of Contents):
Joy O. Lim

Board of Directors:
Linda J. LeZotte, Chair - District 4
Patrick Kwok, Vice Chair – District 5
Donald Gage – District 1
Joe Judge – District 2
Richard Santos – District 3
Tony Estremera – District 6
Brian Schmidt – District 7

Executive Summary

OVERVIEW

The Santa Clara Valley Water District (District) monitors regional groundwater quality in the Santa Clara and Llagas Subbasins on an annual basis in support of Board Water Supply Objective 2.1.1 which directs the District to: "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion." The primary objectives of this monitoring are to evaluate groundwater quality against established water quality objectives and to provide information to protect the long-term viability of the resource.

The majority of wells within Santa Clara County produce high-quality water that meets drinking water standards without the need for treatment. The primary exception is nitrate, which is elevated in a number of South County wells and continues to be a concern that the District and other agencies like the Regional Water Quality Control Boards are working to address. The continued District evaluation of regional groundwater quality and potential threats helps ensure that potential adverse impacts can be identified and appropriately addressed to support continued availability of high-quality groundwater.

This 2011 Groundwater Quality Report includes an evaluation of water quality data from 67 wells sampled by the District and 241 wells sampled by 12 water retailers or city municipal systems and 44 small water systems during calendar year 2011. Unlike public water suppliers who sample for compliance purposes, the District monitors groundwater to assess regional conditions.

The evaluation of 2011 groundwater monitoring results indicates the following:

- Groundwater quality throughout Santa Clara County is generally very good, with nearly all water supply wells meeting primary drinking water standards without the need for treatment.
- In North County (the Santa Clara Plain), 95% of water supply wells tested met the Maximum Contaminant Level (MCL) for aluminum, with three wells above the MCL.
- In South County (the Coyote Valley and Llagas Subbasin), 97% of water supply wells tested met the MCLs for aluminum and perchlorate and 91% of supply wells tested for nitrate met the MCL.
- Bacteria was present in 5 South County domestic wells tested under the regional monitoring program.
- For all other parameters, 100% of water supply wells tested met MCLs.
- Nitrate remains the most significant groundwater quality challenge in Santa Clara County.

This report includes the following information for each subbasin: general evaluation of water quality conditions; comparison of 2011 water quality data to drinking water standards and agricultural objectives; and analysis of water quality trends of nitrate, total dissolved solids (TDS), and chloride over the last 10 years. As the Santa Clara and Llagas Subbasins have significant confining layers separating the aquifers into shallow and principal zones, data is analyzed for each aquifer zone. The results of this evaluation are summarized below.

COMPARISON TO DRINKING WATER STANDARDS

Primary Drinking Water Standards

The 2011 median concentrations for common inorganic parameters are generally well below California Department of Public Health (CDPH) drinking water standards and Regional Water Quality Control Board agricultural water

quality objectives for each subbasin and aquifer zone. The one notable exception is nitrate, with the median concentration in the Llagas Subbasin shallow aquifer zone approaching the primary, health-based MCL of 45 milligrams per liter (mg/L). However, most water supply wells pump water from the principal aquifer zone, which has a median nitrate concentration of 21.2 mg/L.

As shown in Table ES-1, nitrate, aluminum, perchlorate, and arsenic were detected above primary, health-based MCLs in 2011. Bacteria was also present in five South County domestic cooperative wells sampled as part of the regional monitoring program[1]. For the wells analyzed in this report, primary drinking water standards were exceeded at the following percentage of wells tested: nitrate (7%), aluminum (3%), perchlorate (1%), and arsenic (less than 1%). Detections above MCLs occurred at both monitoring wells and water supply wells.

Elevated nitrate concentrations are an ongoing groundwater protection challenge in the Coyote Valley and Llagas Subbasin. The District has undertaken various efforts to define the extent and severity of nitrate contamination, identify potential sources, and reduce nitrate loading. Current efforts focus on the evaluation of nitrate data to assess hot spots and trends, public outreach, and collaboration with other agencies to increase water and nutrient use efficiency. Nitrate management strategies will also be evaluated as part of the regional salt and nutrient management plans, which are scheduled to be developed by 2014 in coordination with groundwater basin stakeholders.

The District also continues to monitor progress of the cleanup of the perchlorate plume in the Llagas Subbasin, which has impacted a number of private wells. A highway safety flare manufacturing facility operated in Morgan Hill from the 1950s to the mid-1990s. Due to onsite activities, perchlorate leached through the soil into groundwater over time, a condition that was first discovered in 2000. At the urging of the District and the community, the Central Coast Regional Water Quality Board has taken timely action to ensure groundwater quality is restored. As of March 2012, the responsible party is providing replacement water for 8 wells compared to 661 wells requiring replacement water in 2004. Groundwater remediation activities by the responsible party are ongoing.

Total coliform bacteria was present in 5 of the 17 domestic cooperative South County wells for which it was analyzed. Of those wells, Escherichia coli (E. coli) was present in one well. Public water systems collecting fewer than 40 samples per month are in violation of the total coliform MCL if more than one sample collected is total coliform positive or if any repeat sample is positive for fecal coliform or E. coli. Although these private wells are not subject to state drinking water standards, the District notified well owners of the presence of bacteria by phone along with information on how to address the bacteria in their water.

Secondary Drinking Water Standards

The following parameters were detected above secondary, aesthetic-based drinking water standards in 2011: TDS, specific conductance, manganese, iron, pH, aluminum, and turbidity. For the wells analyzed in this report, secondary MCLs were exceeded at the following percentage of wells tested: TDS (23%), manganese (15%), specific conductance (15%), iron (10%), pH (6%), turbidity (5%), and aluminum (5%). It should be noted that the drinking water standards for some parameters, such as TDS, are given as a range by CDPH. For these parameters, the lowest value (recommended limit) was used in this analysis.

[1] In FY 12, the District offered basic water quality testing to private domestic well owners in South County under the South County Water Quality Testing Program; the testing results for that program are not included in this report and will be summarized in a separate report. This 2011 Groundwater Quality Report only includes data collected on an ongoing basis to assess regional conditions, which includes some cooperative private domestic wells.

Table ES-1 Wells with Constituents Exceeding Primary Drinking Water Standards in 2011

Subbasin	Area and Zone	Parameter	Notes
Santa Clara Subbasin	Santa Clara Plain Shallow Zone	Arsenic	Arsenic was detected above the MCL at one shallow monitoring located near the southern shore of San Francisco Bay. This well is not used for domestic or irrigation supply.
	Santa Clara Plain Principal Zone	Aluminum	Aluminum was detected above the MCL at three public water supply wells. Subsequent testing at one well did not find concentrations above the MCL.
	Coyote Valley	Nitrate	Nitrate was detected above the MCL at 2 water supply wells and one private domestic supply well.
Llagas Subbasin	Shallow Zone	Bacteria Nitrate	Total coliform bacteria were present in two domestic wells and E. coli was present in one of those wells. Nitrate was detected above the MCL at 9 monitoring wells and 2 private domestic supply wells.
	Principal Zone	Aluminum Bacteria Nitrate Perchlorate	Aluminum was detected above the MCL at one monitoring well. Total coliform bacteria were present in 3 domestic wells. Nitrate was detected above the MCL at 5 water supply wells (3 domestic and 2 public). Perchlorate was detected above the MCL at 2 public water supply wells.

Note:
Wells sampled by the District include monitoring wells and private domestic wells, which are not subject to regulation by CDPH. While this report includes the analysis of data collected by public water suppliers, the identification of any parameter above drinking water standards in this report does not necessarily indicate the delivery of unsafe water to consumers. CDPH does not consider a single detection of a contaminant to be indicative of contamination and does not consider a single detection to be an actual finding without a follow-up detection. Public water suppliers are required to meet drinking water standards, which may require blending or treatment prior to delivery.

COMPARISON TO AGRICULTURAL OBJECTIVES

Comparison of 2011 data against the San Francisco Bay Water Quality Control Plan (San Francisco Bay Basin Plan) agricultural objectives indicates relatively few instances where parameters were detected above objectives for wells located in the Santa Clara Plain and Coyote Valley. The primary exception is nitrate, which exceeded the agricultural objective in 1 of 14 wells in the Santa Clara Plain shallow aquifer zone, 35 of 155 wells in the Santa Clara Plain principal aquifer zone, and 10 of 24 wells in the Coyote Valley. These exceedances are likely due to the current and historic agricultural practices in these areas.

In the Llagas Subbasin, 5 parameters were detected above agricultural objectives set forth in the Water Quality Control Plan for the Central Coastal Basin (Central Coast Basin Plan): bicarbonate, chloride, specific conductance, nitrate, and sodium adsorption ratio (SAR). Of those parameters, the thresholds for specific conductance and bicarbonate are given as a range. About 25% of wells tested for specific conductance exceeded the lowest threshold, which marks the beginning of increasing problems with regard to salinity. However, no wells exceeded the upper limit. The same is true of bicarbonate in that no wells exceeded the upper limit at which point severe problems can occur with regard to calcium carbonate deposits on fruit and leaves. District staff will continue to monitor potential changes in specific conductance and other parameters exceeding agricultural objectives.

WATER QUALITY TREND ANALYSIS

To evaluate changes in water quality for select water quality indicators, trend analyses for TDS, chloride, and nitrate were conducted using ten years of data (2002 - 2011). For all parameters and aquifer zones, the majority of wells do not indicate clear evidence of trend. There were upward trends for the following percentage of wells: nitrate (5%), TDS (3.5%), and chloride (4%). For the wells analyzed countywide for trend, there were downward trends for the following percentage of wells: nitrate (12%), TDS (2%), and chloride (2%).

When trends were present within a given subbasin and aquifer zone, the number of wells showing either an increasing or decreasing trend was generally similar. The notable exception is nitrate within the principal zone of the Llagas Subbasin, which showed a positive trend in that more wells had a downward trend (23 wells) than upward (8 wells).

In the Santa Clara Plain and Coyote Valley, the location of wells with detectable nitrate and chloride trends did not appear to be entirely random with certain areas marked by wells having generally consistent trend results. For example, in Coyote Valley, most wells with downward trends are clustered along or near Coyote Creek, in the southeasterly portion of the valley. The likely cause of this decrease is the District's managed recharge of local reservoir and imported water, which contains lower nitrate concentrations. The District will further evaluate potential causes for the apparent clusters that may indicate a localized concern (increasing trends). In the Llagas Subbasin, no easily discernable pattern of nitrate trend results was evident, while trends of TDS and chloride were too few in number to attempt to discern any pattern.

Work currently being conducted to analyze trends for the salt and nutrient management plan suggests that using ten years of data may not adequately capture longer-term changes in groundwater quality. The District will re-evaluate alternative approaches to analyzing trends in future annual groundwater quality reports.

SUMMARY

Analysis of 2011 groundwater quality data from monitoring performed by the District and water suppliers indicates that groundwater in Santa Clara County generally meets drinking water standards without additional treatment. The most notable water quality issues continue to be nitrate and perchlorate, primarily in the Llagas Subbasin. The trend analysis using data from 129 wells from 2002 to 2011 indicates that in the Llagas Subbasin, nitrate is decreasing in 18% of the wells, increasing in 6% of wells, and showing no trend in 76% of wells analyzed for trend.
In general, the Santa Clara Plain, Coyote Valley, and Llagas Subbasin produce high-quality water and the majority of wells meet drinking water standards. However, the detections above drinking water standards noted in this report present a challenge to water suppliers and private well owners who may need to blend or treat the water prior to delivery or use.

The District will continue to collect and analyze groundwater quality data to characterize groundwater quality, determine the severity and extent of contamination, and evaluate changes in water quality over time to help ensure the groundwater subbasins are aggressively protected from the threat of contamination. Understanding the quality of groundwater and potential degradation or adverse trends allows the District to better understand individual threats and pursue appropriate action to protect groundwater quality. These actions may include:

- Performing additional analysis to determine possible causes and remedies to address potentially adverse conditions or trends.
- Conducting public outreach to raise awareness of groundwater protection.
- Coordinating with regulatory agencies to pursue the timely restoration of degraded groundwater.
- Developing strategies to address ongoing loading of salts and nutrients, like nitrate.
- Working with local cities and the county to ensure land use activities do not adversely impact groundwater resources.
- Efforts to influence statewide legislation and policy to ensure groundwater resources are aggressively protected.

1 2011 GROUNDWATER QUALITY REPORT
Introduction

1.1 INTRODUCTION

The Santa Clara Valley Water District (District) monitors groundwater quality as part of its groundwater management activities in support of Board Water Supply Goal 2.1: "Current and future water supply for municipalities, industries, agriculture and the environment is reliable" and the related Water Supply Objective 2.1.1: "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion."

The overall objectives of groundwater quality monitoring are to evaluate groundwater quality against established water quality objectives and to provide information to protect the long-term viability of the resource. Specific goals of the groundwater quality monitoring program are to: 1) characterize regional groundwater quality conditions, 2) determine the severity and extent of any contamination, 3) evaluate temporal trends in water quality, and 4) identify any threats to groundwater quality and determine where further study or action is warranted to protect groundwater resources.

This 2011 Groundwater Quality Report summarizes the results of groundwater quality monitoring conducted in Santa Clara County (county) during calendar year 2011. This includes results of the District's monitoring program data and other monitoring data acquired through the California Department of Public Health (CDPH) water quality database, which contains data from water suppliers, including water retailers, mutual water systems and municipalities. The use of these two data sources provides an improved spatial distribution of sampling points (wells) for the evaluation of regional groundwater quality conditions and helps to minimize District sampling costs.

Using 2011 groundwater quality data collected by the District and water suppliers, this report evaluates:

- General groundwater quality conditions based on major and minor ions, nutrients, trace elements, volatile organic compounds, pesticides, and radionuclides.
- Groundwater quality as compared to drinking water standards and agricultural objectives.
- Water quality trends for select parameters (nitrate, total dissolved solids, and chloride) over the last ten years.

1.2 GENERALIZED HYDROGEOLOGY

Santa Clara County includes portions of two groundwater basins as defined by the California Department of Water Resources (DWR)[1]: the Santa Clara Valley Basin (Basin 2-9) and the Gilroy-Hollister Valley Basin (Basin 3-3). This report includes water quality data for the groundwater subbasins within Santa Clara County managed by the District: the Santa Clara Subbasin (Subbasin 2-9.02) and the Llagas Subbasin (Subbasin 3-3.01), which cover a surface area of approximately 315 square miles (Figure 1-1). Due to different land use and management characteristics, the District further delineates the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and the Coyote Valley.

[1] California Department of Water Resources, Bulletin 118, 2003.

Both the Santa Clara and Llagas Subbasins are divided into confined and recharge areas. Within confined areas, laterally extensive low permeability clays and silts (confining units or aquitards) divide upper and lower aquifers. The District refers to these as the shallow and principal aquifers, with the latter defined as aquifer materials greater than 150 feet below ground surface. Confining units impede the vertical flow of groundwater, causing principal aquifers to be under pressure.

By restricting the movement of contaminants, confining units also provide some natural protection to principal aquifers. Recharge areas are primarily comprised of high permeability aquifer materials like sands and gravels that allow surface water to infiltrate into the aquifers. Most groundwater recharge occurs in these areas through the infiltration of precipitation and the District's managed recharge to augment groundwater supplies.

The vast majority of water used within the county is pumped from the principal aquifer zone. For the purposes of this analysis and report, wells primarily drawing water from depths greater than 150 feet are assumed to represent the principal aquifer zone. It should be noted that the concept of shallow and principal aquifer zones is not strictly applicable in the recharge areas. However, the general categorization is still worthwhile in that it allows for the separate evaluation of water quality from very shallow zones and from the deeper zones that are more commonly drawn upon for beneficial use. Figures 1-2 and 1-3 illustrate the wells sampled by both the District and by water suppliers in 2011.

1.3 DISTRICT MONITORING

The District collected groundwater quality samples in September and October of 2011 as part of the regional annual monitoring program. Samples were collected from 67 wells, which include a mix of District-owned monitoring wells and cooperative wells owned by other entities, including cities and private well owners. Cooperative wells sampled under the regional monitoring program include dedicated monitoring wells and private domestic water supply wells. To evaluate regional groundwater quality conditions and assess changes in quality, the District analyzed samples for major and minor inorganic compounds, synthetic organic compounds, and other commonly included parameters such as nitrate, total dissolved solids (TDS), and specific conductance (or electrical conductivity [EC]). Hardness and coliform bacteria were also analyzed for cooperative domestic wells in the Coyote Valley and Llagas Subbasin[2]. Appendix A contains a complete list of parameters analyzed by the District. Samples were collected in accordance with widely accepted procedures for groundwater sample collection, filtering, preservation, and handling. The District provided a copy of the laboratory results for each well sampled by the District to the respective well owner.

1.4 WATER SUPPLIER MONITORING

Each year, the District acquires data from CDPH, which includes the results of monitoring performed by the county's water retailers and other water suppliers for compliance with CDPH regulations. For 2011, the CDPH database has data on 241 wells within the Santa Clara and Llagas Subbasins that were sampled and analyzed for a wide range of parameters. In general, the CDPH data used in this evaluation is from high capacity water supply wells with multiple screens drawing water from numerous individual aquifer zones. In addition to those parameters analyzed under the District's program, the CDPH data contains information on radionuclides, and semi- and non-volatile organic compounds (pesticides).

[2] These parameters were included for consistency with the District's South County Water Quality Testing Program, a free testing program offered to private domestic well owners in South County in fiscal year 2012. That program offered testing for nitrate, bacteria, electrical conductivity, and hardness. The testing results for the South County Water Quality Testing Program are not included in this evaluation of regional conditions and will be summarized in a separate report.

A summary of the number of wells sampled in each subbasin by both the District and water suppliers is shown in Table 1-1. It should be noted that not every well is sampled for the same group of parameters or at the same frequency. Wells in the District's groundwater quality monitoring network are sampled for a consistent set of parameters, listed in Appendix A, during the fall. Water quality data from the water supplier wells varies in terms of parameters analyzed and monitoring frequency based on the status of the well, CDPH compliance schedule, and previous sampling results.

1.5 INTERPRETATION OF GROUNDWATER QUALITY RESULTS

Groundwater samples collected in calendar year 2011 in Santa Clara County were analyzed for 260 chemical parameters. The District's sampling effort including the analysis of 212 individual parameters. For this report, all parameters are grouped into one of four broad chemical groups or classes, including water quality indicators, inorganic parameters, organic parameters, and radioactive parameters as presented in Table 1-2. The following chapters present the results of monitoring for each of the chemical classes.

Comparison to Drinking Water Standards and Agricultural Thresholds

Unlike public water suppliers who sample for compliance purposes, the District samples groundwater to assess regional conditions. Water quality data is presented at the Method Reporting Limit (MRL), which is the lowest level at which a parameter can be detected and reported with a reasonable degree of accuracy and precision. The MRL is laboratory specific and may provide water quality results at a lower level than the minimum State reporting level for drinking water compliance (Detection Limit for Purposes of Reporting). Concentrations in groundwater are compared to CDPH health-based and aesthetic thresholds to provide context for the results presented in this report. Concentrations are also compared to thresholds for agricultural use established by the San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) and the Central Coast Regional Water Quality Control Board (Central Coast Water Board).

This report presents the number of wells with detections greater than health-based or aesthetic-based drinking water standards. It should be noted that the identification of any parameter above regulatory standards in this report does not necessarily indicate the delivery of unsafe water to consumers. CDPH does not consider a single detection of a contaminant to be indicative of contamination and does not consider a single detection to be an actual finding without a follow-up detection. Public water suppliers are required to meet drinking water standards, which may require blending or treatment prior to delivery. The following thresholds are used for comparison in this report:

- **Maximum Contaminant Level (MCL)**
  The MCL is an enforceable standards designed to protect public health by limiting the amount of contamination in drinking water that apply to public water systems. MCLs established by the U.S. Environmental Protection Agency (USEPA) are the minimum standards to which states must adhere, although individual states may adopt more stringent standards. California has set stricter MCLs for certain contaminants and has also set MCLs for a few contaminants not regulated by USEPA. In this report, concentrations are compared to the more stringent standard. Although there are no MCLs for lead and copper, concentrations are compared to action levels, as defined in the CDPH Lead and Copper Rule.

- **Secondary Maximum Contaminant Level (SMCL)**
  An SMCL addresses aesthetic issues related to taste, odor, or appearance of the water and is not related to health effects. In general, SMCLs established by CDPH are used in this report. For one parameter, pH, results are compared to the USEPA SMCL since CDPH has not established a threshold. Concentrations of sulfate, chloride, total dissolved solids, and specific conductance, are compared to both a “recommended” and an “upper” SMCL as identified by CDPH.

- **Basin Plan Agricultural Objectives**
  The Water Boards have established thresholds for agricultural use (including irrigation, farming, etc) in the Water Quality Control Plans (Basin Plans). In this report, concentrations are compared to agricultural water quality objectives in the Basin Plan for the San Francisco Bay Region (for the Santa Clara Subbasin, which includes the Santa Clara Plain and Coyote Valley) and the Central Coast Region (for the Llagas Subbasin).

Estimating Trends in Groundwater Quality

This report also evaluates trends in groundwater quality for select water quality indicators using ten years of data (2002-2011). These include nitrate, which is present above the MCL at a number of South County wells; chloride, which is used to measure salt water intrusion and the deterioration of water quality; and total dissolved solids (TDS), which serves as a general indicator of the suitability of water for beneficial uses. The Mann-Kendall statistical test procedure was used to evaluate potential trends over time at individual wells with adequate data. For some nitrate trend wells with data reported as “non-detectable”, the data was adjusted to the highest detection limit. The Mann-Kendall method was used to test for statistical trends in chloride, TDS, and nitrate in 203, 200, and 412 wells, respectively. Detailed Mann-Kendall results are available in Appendices B through D.

Table 1-1 Number of Wells Sampled in Calendar Year 2011

Subbasin	Wells Sampled by District	Wells Sampled by Water Suppliers	Total
Santa Clara Subbasin			
Santa Clara Plain - Shallow Aquifer Zone	13	1	14
Santa Clara Plain - Principal Aquifer Zone	8	167	175
Coyote Valley	8	19	27
Llagas Subbasin			
Shallow Aquifer Zone	21	0	21
Principal Aquifer Zone	17	54	71
Total	67	241	308

Table 1-2 Classes of Parameters Sampled in Calendar Year 2011

Parameter Class	Parameter Table
Water Quality Indicators	
Physical Properties	2-1
Aggregate Properties	2-1
Bacteria	2-1
Inorganic Parameters	
Major and Minor Ions	3-2
Trace Elements	3-2
Nutrients	3-2
Organic Parameters	
Volatile Organic Compounds	4-1 & 4-2
Pesticides and Pesticide Degradation Products	4-3
Radioactive Parameters	
Radioactive Parameters	4-4

Figure 1-1 Santa Clara County Groundwater Subbasins

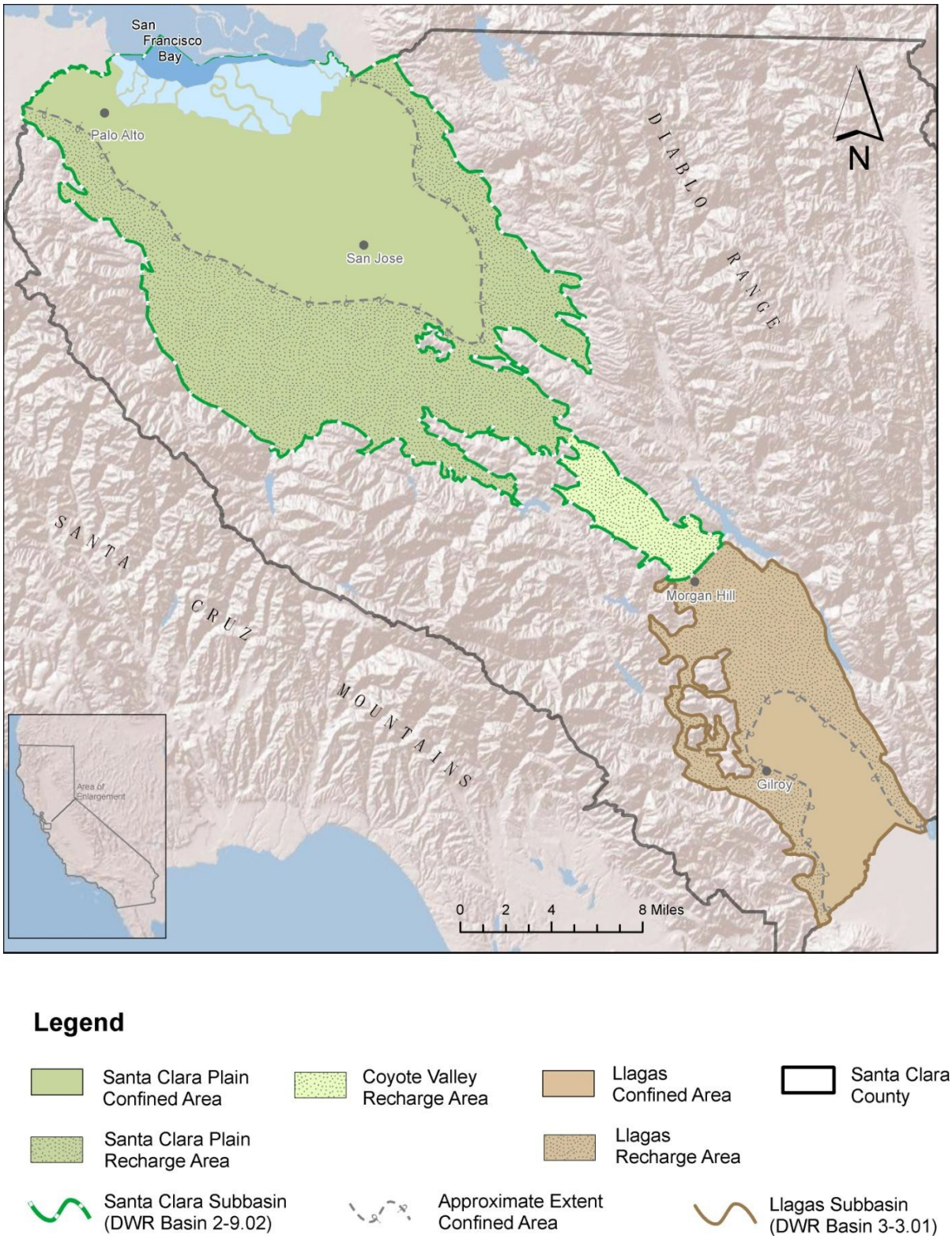
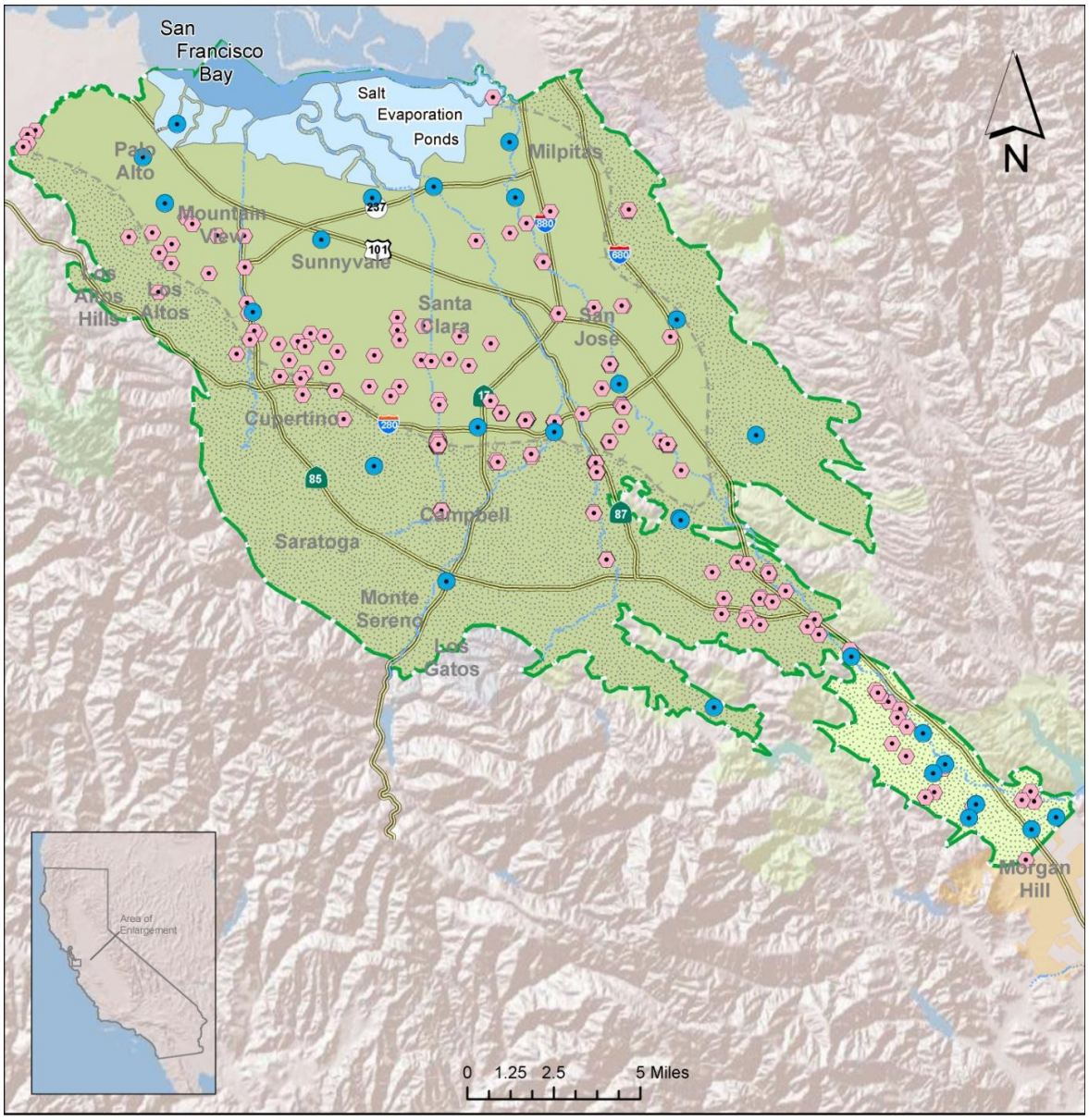


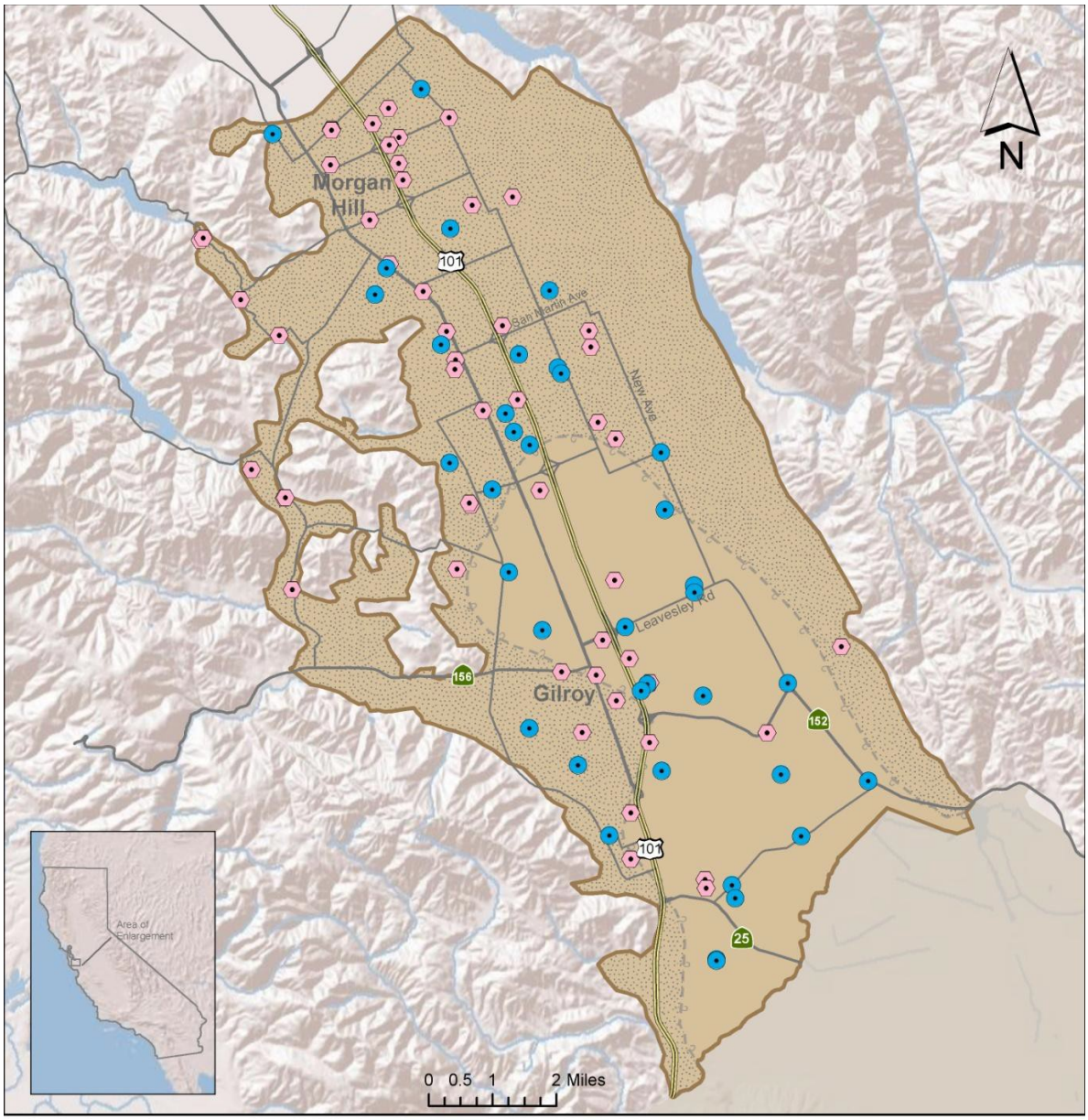
Figure 1-2 Location of Wells Sampled in 2011, Santa Clara Subbasin



Legend

- Well Sampled by Water Supplier
- Well Sampled by Santa Clara Valley Water District
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area

Figure 1-3 Location of Wells Sampled in 2011, Llagas Subbasin



Legend

- Wells Sampled by Water Suppliers
- Wells Sampled by Santa Clara Valley Water District
- Llagas Subbasin (DWR Basin 3-3.01)
- Llagas Confined Area
- Llagas Recharge Area
- Approximate Extent Confined Area

2 2011 GROUNDWATER QUALITY REPORT
Water Quality Indicators

For this report, water quality indicators are defined as the physical and aggregate properties of groundwater that provide an indication of the overall quality. Water quality indicators analyzed in this report include:

- Bacteria, which are naturally present in humans, animals, and the environment but should not be present in drinking water.
- Specific conductance, which measures the waters ability to conduct an electrical current at a specific temperature (25°C) and directly correlates to the amount of dissolved mineral salts in water.
- pH, which measures the acidity and basicity of water and controls various processes affecting water quality, including the ability of water to dissolve substances
- Turbidity, which is an optical property that causes light to be scattered and absorbed by particles and molecules rather than transmitted in straight lines through a water sample. Turbidity is caused by the presence of suspended and dissolved particles and organic matter.

Results for water quality indicators are summarized in Table 2-1 along with their respective drinking water standards, if applicable. Water quality indicator data generally points to the existence of high quality groundwater although some wells had bacteria present and detections above SMCLs are noted.

2.1 COMPARISON TO DRINKING WATER STANDARDS

With the exception of bacteria, the water quality indicators evaluated in this report do not have established health-based drinking water standards (MCLs), although many do have aesthetic-based thresholds (SMCLs). For parameters with drinking water standards, a comparison of 2011 results to the standards is presented below. The water quality indicators detected above drinking water standards are presented in Table 2-2 and shown in Figures 2-1 and 2-2.

Total coliform bacteria was present in 5 of the 17 cooperative domestic South County wells for which it was analyzed. Escherichia coli (E. coli), which is an indicator of fecal contamination, was present in one well. Public water systems collecting fewer than 40 samples per month are in violation of the total coliform MCL if more than one sample collected is total coliform positive or if any repeat sample is positive for fecal coliform or E. coli. Although the private domestic wells tested are not subject to state drinking water standards, well owners were notified of the presence of bacteria by phone along with information from the County Department of Environmental Health on how to address the bacteria in their water.

CDPH has established a range for the SMCL for specific conductance, with a lower “recommended” limit of 900 uS/cm and an upper limit of 1,600 uS/cm. The median value for specific conductance ranges from 560 to 757 microSiemens per centimeter (uS/cm) for all aquifer zones of the Santa Clara and Llagas Subbasins, below the lower, recommended CDPH value of 900 uS/cm. In a total of 25 wells (15% of wells tested) specific conductance was measured above the CDPH SMCL recommended value. One well had a specific conductance value greater than the CDPH upper SMCL 1,600 uS/cm. This well is a shallow aquifer zone monitoring well not used for domestic or municipal supply.

The United States Environmental Protection Agency (USEPA) has established an acceptable SMCL range of 6.5 to 8.5 for pH. The SMCL range for pH was not met for 9 wells (6% of wells tested). However, the median pH for all aquifer zones of the Santa Clara and Llagas Subbasins met the SMCL.

Turbidity was measured above the SMCL of 5 Nephelometric Turbidity Units (NTU) in 6 wells (5% of wells tested). The median turbidity for the Santa Clara and Llagas Subbasins ranges from 0.24 to 0.44 NTU, well below the SMCL. Other water quality indicators, including foaming agents, color and odor threshold were not detected above their respective SMCLs.

2.2 COMPARISON TO AGRICULTURAL OBJECTIVES

Concentrations of water quality indicators in groundwater are also compared to applicable objectives for agricultural use such as irrigation that are established by the San Francisco Bay and Central Coast Water Boards in the Water Quality Control Plans (Basin Plans). Agricultural threshold values used for comparison in this report are found in Table 3-6 of the San Francisco Bay Basin Plan and Tables 3-3 and 3-4 of the Central Coast Basin Plan, updated December 2011 and June 2011, respectively.

The Santa Clara Subbasin, which includes the Santa Clara Plain and Coyote Valley, is under the jurisdiction of the San Francisco Bay Water Board and the Llagas Subbasin is under the jurisdiction of the Central Coast Water Board. Since each region has slightly different threshold values, they will be discussed separately. The water quality indicators with agricultural objectives and comparison thresholds for the San Francisco Bay and Central Coast regions are listed in Table 2-3.

Santa Clara Subbasin (San Francisco Bay Region)

In general, groundwater quality throughout the Santa Clara Subbasin meets the agricultural objectives set by the San Francisco Bay Water Board with a few exceptions. The indicator parameters detected above agricultural objectives are pH and specific conductance, at 3 wells and 1 well, respectively. Figure 2-3 depicts the location of wells with detections of agricultural objectives in the Santa Clara Subbasin.

Llagas Subbasin (Central Coast Region)

In general, groundwater quality throughout the Llagas Subbasin meets the agricultural objectives set by the Central Coast Water Board. Specific conductance was the only parameter exceeding agricultural objectives in the Llagas Subbasin. Specific conductance may result in salinity or permeability issues, and the Central Coast Water Board has established separate agricultural objectives for these issues. According to Table 3-3 of the Central Coast Basin Plan, the objective for specific conductance of 750 uS/cm is at the lower end of the range for increasing problems due to salinity and severe problems do not develop until 3,000 uS/cm is reached. Ten wells in the shallow aquifer zone and 7 wells in the principal aquifer zone were found to have specific conductance values greater than the lowest limit of 750 uS/cm. However, all the wells had concentrations far below the level in which severe problems would be expected to occur; the maximum specific conductance values were 1,330 uS/cm and 1,060 uS/cm in the shallow and principal aquifer zones, respectively.

Specific conductance is also used to assess the potential of irrigation water to alter the drainage characteristics of soil, or soil permeability. Unlike other parameters, in which a maximum value is established, soil permeability is protected by establishing a minimum value of specific conductance of 500 uS/cm. Severe problems are expected to occur when irrigation water has a specific conductance of less than 200 uS/cm. In the Llagas Subbasin, 4 wells in the shallow aquifer zone and 8 wells in the principal aquifer zone had specific conductance values less than 500 uS/cm. However, no wells in either zone had specific conductance values less than 200 uS/cm, which would indicate the possibility of severe problems developing. Figure 2-4 depicts the location of wells with detections of agricultural objectives in the Llagas Subbasin.

District staff will continue to monitor potential water quality changes that may impact agricultural use. A summary of parameters detected above established agricultural objectives is presented in Table 2-4.

Table 2-1 Summary of 2011 Water Quality Indicator Data

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain								Santa Clara Subbasin - Coyote Valley				Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Aggressive Index (Corrosivity)	Index	--	--	--	--	45	9.65	12	13	--	--	--	--	--	--	--	--	9	12	12	13	--	--
Alkalinity (Total) as CaCO3	mg/L	14	184	268	513	58	42	220	390	9	165	199	345	21	109	220	388	27	135	200	358	--	--
Alkalinity- Bicarbonate (as CaCO3)	mg/L	14	184	268	513	9	125	272	349	9	165	199	345	21	109	220	388	18	135	210	358	--	--
Alkalinity-Carbonate (as CaCO3)	mg/L	14	<5	<5	49	9	<5	<5	40	8	<5	<5	<5	21	<5	<5	<5	17	<5	<5	<5	--	--
Alkalinity- Hydroxide (as CaCO3)	mg/L	14	<5	<5	<5	9	<5	<5	<5	8	<5	<5	<5	21	<5	<5	<5	17	<5	<5	<5	--	--
Caffeine	ug/L	--	--	--	--	8	<0.05	<0.05	<0.05	4	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--
Carbonate Alkalinity	mg/L	14	-5	<5	30	53	<5	<5	24	9	<5	<5	<5	21	<5	<5	<5	18	<5	<5	<5	--	--
Color	Units	--	--	--	--	44	<5	<5	3	1	0	0	0	--	--	--	--	1	0	0	0	--	15
E Coli.	P/A	--	--	--	--	--	--	--	--	2	All Absent			4	3 Absent, 1 Present			11	All Absent			--[9]	--
Foaming Agents (MBAS)	ug/L	--	--	--	--	44	<0.05	<0.05	0.09	--	--	--	--	--	--	--	--	1	0.100	0.100	0.100	--	500
Hardness (Total) as CaCO3	mg/L	--	--	--	--	49	124	263	456	3	247	254	317	4	267	325	338	21	178	250	444	--	--
Hydroxide Alkalinity	mg/L	14	<5	<5	<5	53	<1	<1	<5	8	<5	<5	<5	21	<5	<5	<5	17	<5	<5	-5	--	--
Langelier Index 60°C	Index	--	--	--	--	15	-0.16	0.73	1.2	--	--	--	--	--	--	--	--	9	0.35	0.53	0.69	--	--
Langelier Index at Source Temp.	Index	--	--	--	--	30	-2.37	-0.35	0.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Odor Threshold 60°C	TON	--	--	--	--	49	<1	<1	1	1	<1	<1	<1	--	--	--	--	10	<1	<1	<1	--	3
pH[10]	pH Units	14	6.49	7.20	8.90	90	5.04	7.3	8.40	7	6.67	7.35	7.70	19	6.51	7.0	7.69	27	6.56	7.31	8.2	--	6.5-8.5
Source Temperature	°C	13	16.6	20	21.2	14	18	20	23	8	17.7	19	22.7	21	18.1	19.1	24.3	17	17.3	19.5	23	--	--
Specific Conductance[10]	uS/cm	14	500	757	3,950	71	317	640	1,200	14	461	631	1,130	21	296	732	1,330	131	320	560	1,060	--	900 (1,600)
Total Coliform	P/A	--	--	--	--	--	--	--	--	2	All Absent			4	2 Absent, 2 Present			11	8 Absent, 3 present			--[9]	--
Turbidity[10]	NTU	13	0.12	0.28	9.9	57	0.03	0.25	6.7	9	0	0.24	5.6	21	0	0.44	9.25	21	0.07	0.44	5.71	--	5

1. mg/L = milligrams per liter; uS/cm = microSiemens per centimeter; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per California Department of Public Health or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.
9. A public water system collecting fewer than 40 samples per month is in violation of the total coliform MCL if more than one sample is total coliform positive or if there is a repeat positive for fecal coliform or E. coli. All wells sampled in 2011 were private domestic wells.
10. Summary statistics computed from combined laboratory and field measured data.

Table 2-2 Water Quality Indicators Detected Above Drinking Water Standards in 2011

Parameter[1]	Number of Wells Analyzed	Number of Wells Above Threshold[2]	MCL[3]	SMCL[4]
Santa Clara Subbasin Santa Clara Plain – Shallow Aquifer Zone[5]				
Specific Conductance (uS/cm)	13	6 (1)	--	900 (1,600)
pH[4]	13	2		6.5 – 8.5
Turbidity (NTU)	13	1		5
Santa Clara Subbasin Santa Clara Plain – Principal Aquifer Zone[6]				
Specific Conductance (uS/cm)	67	11 (0)	--	900 (1,600)
pH	74	7		6.5 – 8.5
Turbidity (NTU)	54	1	--	5
Santa Clara Subbasin Coyote Valley				
Specific Conductance (uS/cm)	14	1 (0)	--	900 (1,600)
Turbidity (NTU)	9	1	--	5
Llagas Subbasin – Shallow Aquifer Zone				
E. Coli (present)[7]	4	1	--[7]	
Specific Conductance (uS/cm)	21	6 (0)	--	900 (1,600)
Total Coliform (present)[7]	4	2	--[7]	
Turbidity NTU)	21	2	--	5
Llagas Subbasin – Principal Aquifer Zone				
Specific Conductance (uS/cm)	48	1 (0)	--	900 (1,600)
Total Coliform (present)[7]	11	3	--[7]	
Turbidity (NTU)	21	1	--	5

Notes:

1. uS/cm = microSiemens per centimeter; NTU = Nephelometric Turbidity Units
2. The number of wells with detections above the recommended threshold is listed, with the number of wells with detections above the upper threshold shown in parentheses. For pH, this represents the number of wells falling outside the optimal pH range.
3. MCL = Maximum Contaminant Level, or health-based standard, set by the California Department of Public Health (CDPH).
4. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, set by the CDPH or EPA. For SMCLs given as a range, the lower, recommended threshold is listed first, with the upper threshold shown in parentheses.
5. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
6. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
7. The number of wells with bacteria present is shown. A public water system collecting fewer than 40 samples per month is in violation of the total coliform MCL if more than one sample is total coliform positive or if there is a repeat positive for fecal coliform or E. coli. All wells sampled in 2011 were private domestic wells.

Table 2-3 Basin Plan Agricultural Objectives for Water Quality Indicators

Parameter	Units	San Francisco Bay Region[1]	Central Coast Region[2]
Specific Conductance (Salinity)	uS/cm	200 – 3,000[5]	750[4]
Specific Conductance (Permeability)	uS/cm	--	<500[5]
pH		5.5 – 8.3	6.5 – 8.4

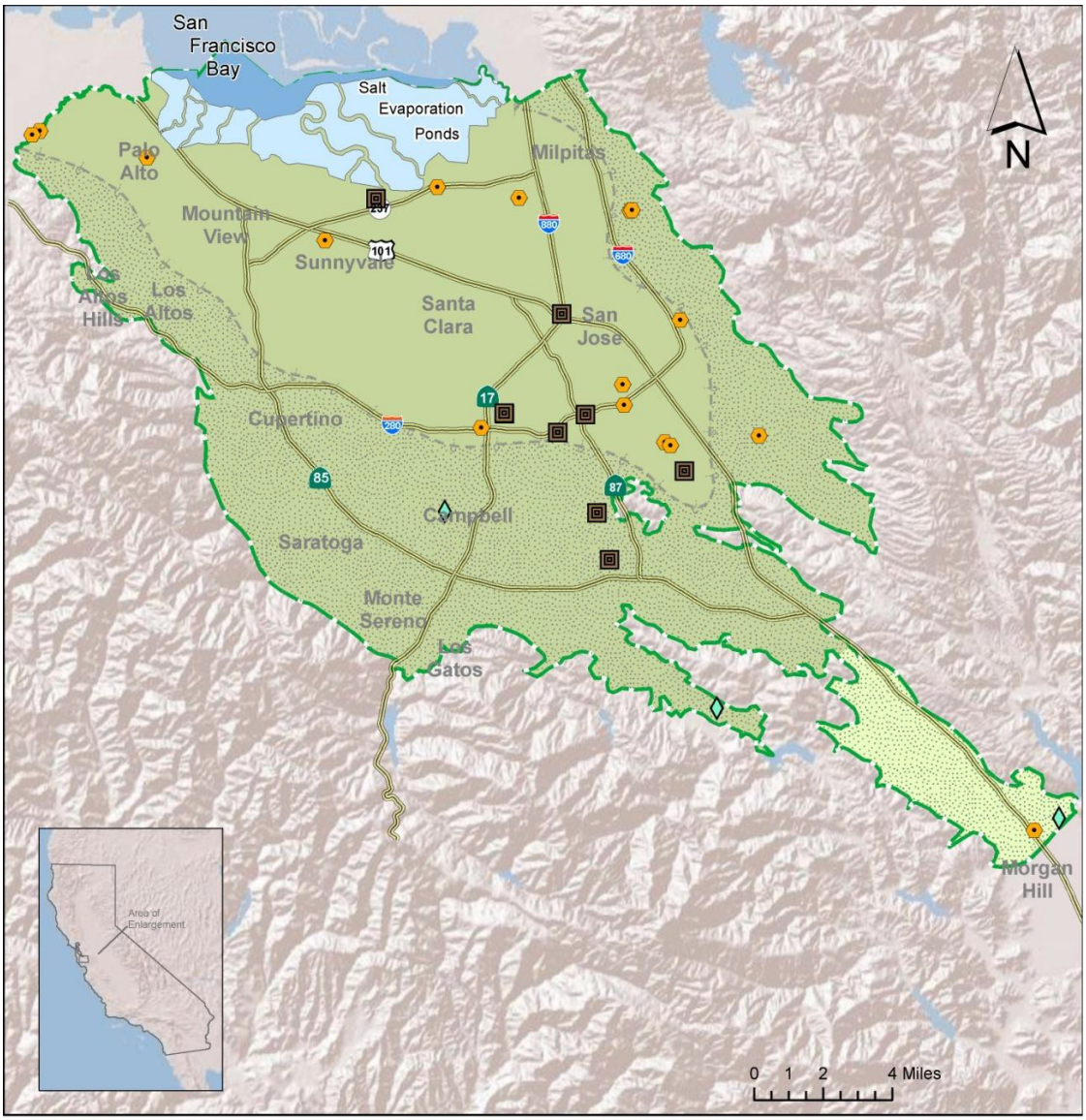
Notes:

1. Agricultural objectives shown are threshold values from the San Francisco Bay Basin Plan (Table 3-6), except as noted.
2. Agricultural objectives shown are based on the maximum concentration for irrigation supply per Central Coast Basin Plan Table 3-4 (Water Quality Objectives for Agricultural Water Use) and Table 3-3 (Guidelines for Interpretation of Quality of Water for Irrigation), except as noted. If a parameter is listed in both tables, the lowest threshold is used.
3. The bicarbonate objective applies only to irrigation with overhead sprinklers.
4. The specific conductance concentration represents the low end of the range for “increasing problems” for salinity from Central Coast Basin Plan Table 3-3.
5. To avoid damage to soil structure (permeability), specific conductance of irrigation water should not be less than 500 uS/cm.

Table 2-4 Water Quality Indicators Detected Above Agricultural Objectives in 2011

Parameter	Number of Wells Analyzed	Number of Wells Above Threshold
Santa Clara Subbasin Santa Clara Plain – Shallow Aquifer Zone		
pH	13	1
Specific Conductance	13	1
Santa Clara Subbasin Santa Clara Plain – Principal Aquifer Zone		
pH	74	2
Santa Clara Subbasin Coyote Valley		
None		
Llagas Subbasin– Shallow Aquifer Zone		
Specific Conductance (Salinity)	21	10
Specific Conductance (Permeability)	21	4
Llagas Subbasin – Principal Aquifer Zone		
Specific Conductance (Salinity)	48	7
Specific Conductance (Permeability)	48	8

Figure 2-1 Wells with Water Quality Indicators Detected Above Drinking Water Standards in 2011, Santa Clara Subbasin



Legend

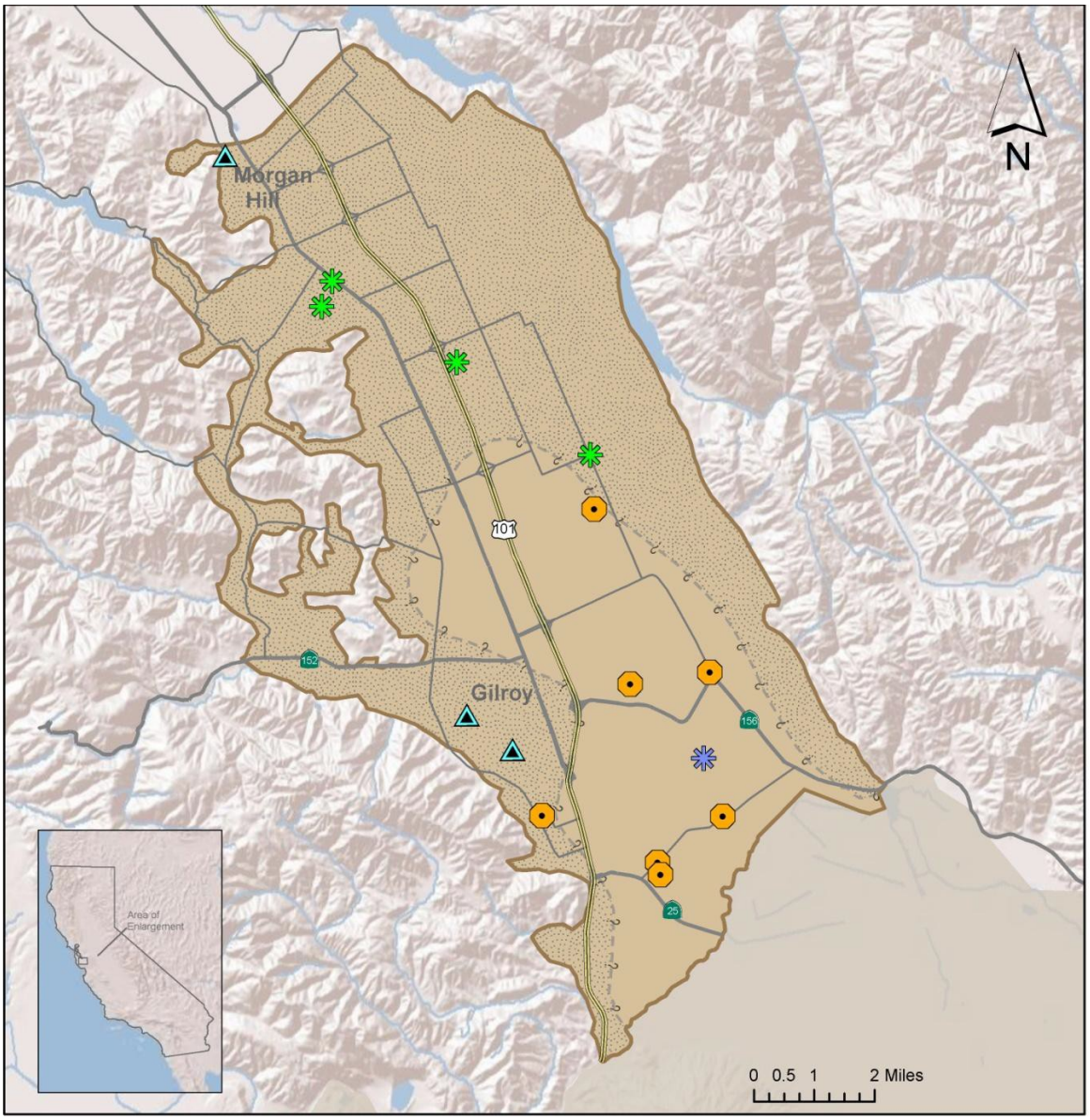
Detection of Indicator Parameters Above Secondary MCLs Due To:

- Specific Conductance
- Turbidity
- pH

- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area

- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area

Figure 2-2 Wells with Water Quality Indicators Detected Above Drinking Water Standards in 2011, Llagas Subbasin



Legend

Detection of Indicator Parameters Above Secondary MCLs Due To:

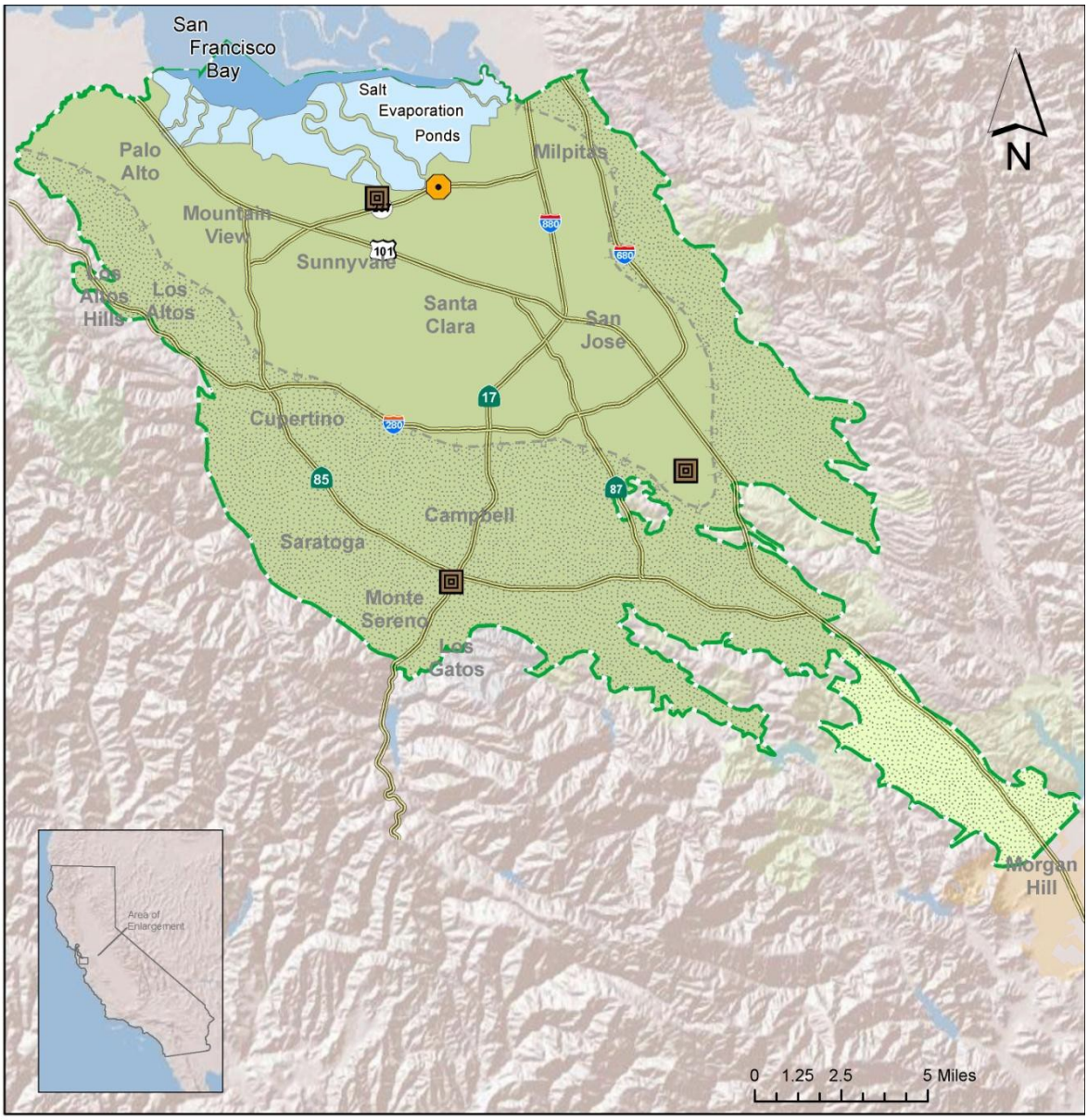
- Specific Conductance
- pH, Turbidity

Detection of Indicator Parameters Above Primary MCLs Due To:

- Total Coliform
- Total Coliform, E. Coli

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

Figure 2–3 Wells with Water Quality Indicators Detected Above Agricultural Objectives in 2011, Santa Clara Subbasin



Legend

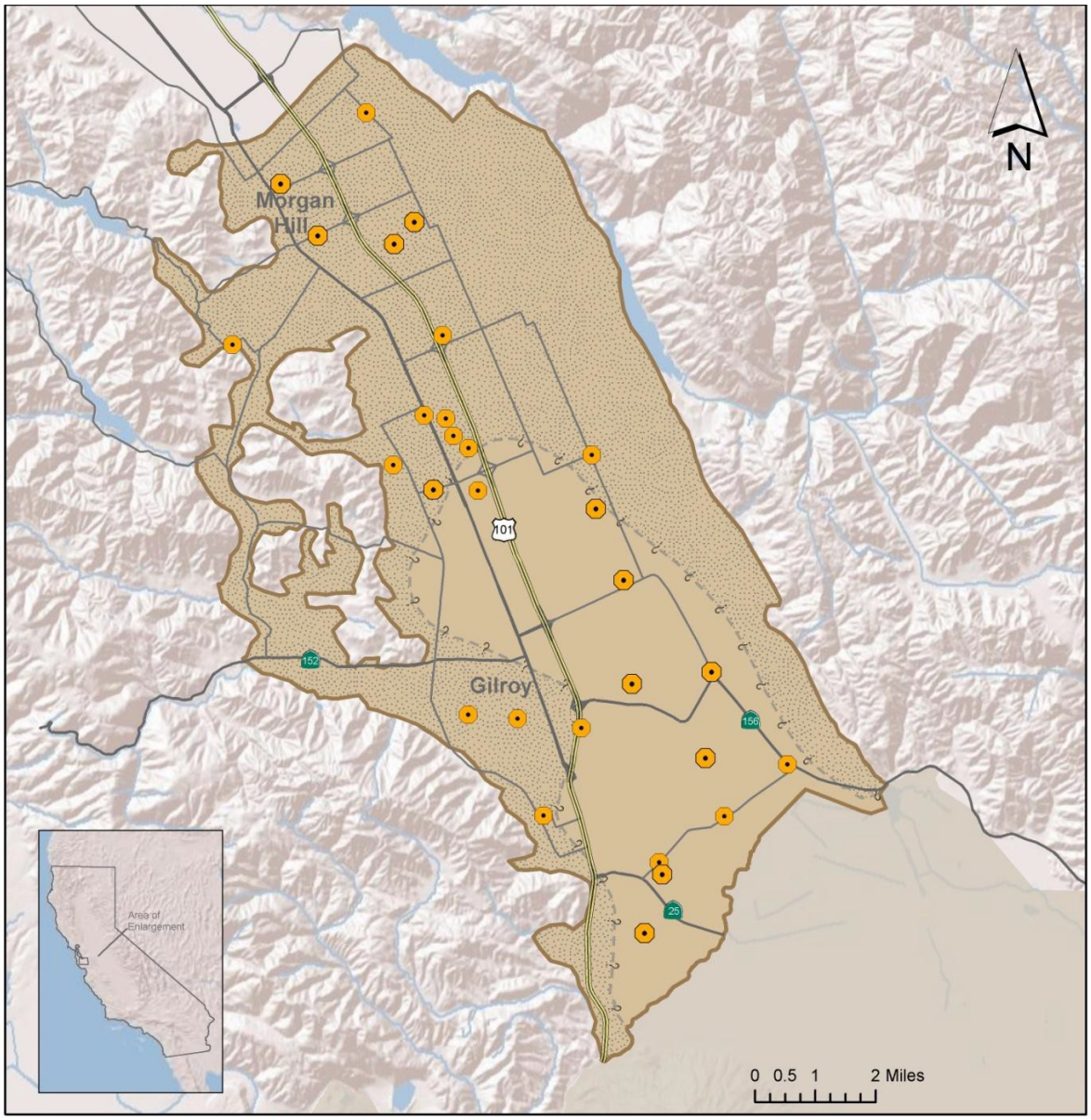
Detection of Indicator Parameters Above Agricultural Objectives (SF Region) Due To:

- Specific Conductance
- pH

- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area

- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area

Figure 2–4 Wells with Water Quality Indicators Detected Above Agricultural Objectives in 2011, Llagas Subbasin



Legend

Detection of Indicator Parameters Above Agricultural Objectives (Central Coast Region) Due To:

Specific Conductance

Llagas Confined Area

Llagas Recharge Area

Llagas Subbasin (DWR Basin 3-3.01)

Approximate Extent Confined Area

3 2011 GROUNDWATER QUALITY REPORT
Inorganic Parameters

As indicated in Table 3-1, groundwater quality throughout the county is generally very good with respect to inorganic parameters including major and minor ions and trace elements, with most results well below established drinking water standards. TDS in principal aquifer zones ranges from 359 to 380 mg/L, indicating high quality water with respect to dissolved solids. A more detailed comparison to drinking water standards is presented below.

Most of the parameters in this class are derived in groundwater by means of natural processes including erosion and rock weathering, although they can also be introduced to groundwater by human activities at the land surface. The parameters in this class are listed and summarized in Table 1-1 and consist of common and relatively abundant parameters (major ions), less abundant ions (minor ions), nutrients, and certain elements which are present in groundwater, but only in minute quantities.

The major ion composition, total dissolved solids (TDS), and certain trace elements affect the aesthetic qualities of groundwater including taste, color, odor, and propensity of staining and scale formation. Other parameters in this class can adversely affect human health, and in the case of nitrate, particularly the health of infants. A total of 17 parameters in this class have established health-based MCLs and 9 have aesthetic-based SMCLs. For those detections above established thresholds, a summary table according to subbasin and aquifer zone is presented in Table 3-2. Detailed results for all inorganic parameters are presented in Table 3-1.

3.1 COMPARISON TO DRINKING WATER STANDARDS

The majority of wells sampled in 2011 did not contain inorganic parameters above their respective MCLs. Aluminum, arsenic, nitrate and perchlorate were detected above MCLs, with nitrate detected most frequently as described below.

Aluminum

Aluminum was detected above the MCL of 1,000 micrograms per liter (ug/L) in three public water supply wells in the Santa Clara Plain. Aluminum was also detected above its SMCL of 200 ug/L. Subsequent testing at one of the wells did not confirm the presence of aluminum above the MCL. Aluminum was also detected above the MCL at one monitoring well in the Llagas Subbasin. The median aluminum concentration of all wells tested in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin ranged from 23.9 to 58.5 ug/L, well below the MCL.

Aluminum is typically naturally occurring. Some people who drink water containing aluminum in excess of the MCL over many years may experience short-term gastrointestinal effects.

Arsenic

Arsenic was detected above the MCL of 10 ug/L in one shallow monitoring well in the Santa Clara Plain. This monitoring well is located near the southern shore of the San Francisco Bay and is not used for domestic or irrigation supply. The median arsenic concentration for all wells tested in 2011 was less than 2 ug/L.

Arsenic is naturally occurring and can also result from industrial processes. The ingestion of arsenic above established health thresholds is linked to cancer and can also result in vascular or skin effects.

Nitrate

None of the 169 wells tested in the Santa Clara Plain contained nitrate above the MCL of 45 milligrams per liter (mg/L). Concentrations in the Santa Clara Plain ranged from non-detectable to 44.6 mg/L, with a median principal zone concentration of 15 mg/L. In Coyote Valley, 3 of 24 wells (12.5%) tested contained nitrate above the MCL. Concentrations of nitrate ranged from non-detectable to a maximum of 78 mg/L, with a median of 11.7 mg/L. The Llagas Subbasin had the most detections of nitrate above the MCL with 5 of 64 (8%) wells containing nitrate above the MCL. In the shallow aquifer zone of the Llagas Subbasin, about 50% of wells had nitrate above the MCL, with a maximum concentration of 164 mg/L measured in one well. The median nitrate concentration in the shallow and principal aquifer zones of the Llagas Subbasin was 48 and 21.2 mg/L, respectively.

Common sources of nitrate are fertilizers, septic systems, and livestock waste. Elevated nitrate is most often found in rural and agricultural areas, so nitrate is an ongoing groundwater protection challenge, particularly in South County. Nitrate can interfere with the blood's ability to transport oxygen and is of greatest concern for infants and pregnant women. The effects of nitrate are often referred to as "blue baby syndrome."

The District has undertaken numerous efforts to define the extent and severity of nitrate contamination, identify potential sources, reduce nitrate loading, and reduce customer exposure to nitrate. Current efforts focus on the evaluation of nitrate data to assess hot spots and trends, public outreach, and collaboration with other agencies to increase water and nutrient use efficiency. The District’s recharge operations also serve to dilute existing nitrate concentrations. In fiscal year 2012, the District implemented a program to offer basic water quality testing to South County private domestic well owners, which included testing for nitrate. The results from that testing program are not included in this regional evaluation. A report summarizing the results of the free testing program will be available by June 2012. Nitrate management strategies will also be evaluated as part of the regional salt and nutrient management plans, which are scheduled to be developed by 2014 in coordination with groundwater basin stakeholders.

The evaluation of trends for nitrate and other select parameters of concern is presented in Section 3.3.

Perchlorate

Perchlorate was detected above the MCL of 6 ug/L in 2 wells in the Llagas Subbasin principal zone, however the median concentration was 2.4 ug/L. The median concentration in the Santa Clara Plain (both the shallow and principal zone) and the Coyote Valley was less than 4 ug/L.

Contamination from a former flare manufacturing facility in Morgan Hill was first discovered in 2000 during investigation by a potential buyer. At the urging of the District and the community, the Central Coast Water Board has taken timely action to ensure the contaminated groundwater is restored. Due to cleanup activities and groundwater recharge, perchlorate levels have decreased significantly and the plume is shrinking. As of March 2012, the responsible party is providing replacement water for 8 wells compared to 661 wells requiring replacement water in 2004. Groundwater remediation activities by the responsible party are ongoing with the off-site extraction system expected to start-up by the summer of 2012. Perchlorate can have adverse health effects when present above the MCL as it can interfere with iodine uptake in the thyroid gland, which can affect hormones that regulate metabolism and growth.

Other Parameters

Chloride, iron, manganese, and TDS, were all detected above their respective SMCLs in several wells as summarized in Table 3-2 and depicted on Figure 3-1 and 3-2. Leaching from natural deposits is a typical source for these parameters, although they can also originate from human activities such as industrial and agricultural uses.

Other parameters of interest are mercury and hexavalent chromium. Mercury was tested in the Santa Clara Plain principal zone (49 wells), Coyote Valley (2 wells), and the Llagas Subbasin principal zone (12 samples) and was not detected in any sample (<1 ug/L). There were 25 results for hexavalent chromium (chromium-6) in the principal zone of the Santa Clara Plain and concentrations ranged from non-detectable to 8.1 ug/L. Three samples were analyzed for chromium-6 in the Coyote Valley with a median concentration of 4.6 ug/L. In the Llagas Subbasin, two samples were tested for chromium-6; both had non-detectable results. While total chromium has a drinking water standard (with no exceedances noted in 2011), chromium-6 is not yet specifically regulated. The District will continue to be actively engaged in the state and federal process to establish a drinking water standard for chromium-6.

3.2 COMPARISON TO AGRICULTURAL OBJECTIVES

In addition to comparing concentrations of parameters to drinking water standards, concentrations of select inorganic parameters in groundwater are also compared to standards for agricultural use (irrigation, farming, etc) established by the San Francisco Bay and Central Coast Water Boards. Agricultural threshold values are found in Table 3-6 of the San Francisco Bay Basin Plan and Tables 3-3 and 3-4 of the Central Coast Basin Plan, updated in December 2011 and June 2011, respectively. The parameters with agricultural objectives and comparison thresholds for the San Francisco Bay and Central Coast regions are listed in Table 3-5.

Santa Clara Subbasin (San Francisco Bay Region)

In general, groundwater from wells throughout the Santa Clara Subbasin meets the agricultural objectives set by the Water Board with some exceptions noted. Manganese, boron, chloride, molybdenum, and Sodium Adsorption Ratio (SAR) were detected above agricultural objectives in only a few wells. More commonly detected above agricultural objectives were nitrate, nitrate + nitrite as N. It should be noted that, although there are few results for nitrate + nitrite, the associated threshold is considered to be exceeded if the nitrate concentration alone exceeds the threshold value. Most of the detections above agricultural objectives in the principal aquifer zone are due to nitrate. Figure 3-3 depicts the location of wells with detections of agricultural objectives in the Santa Clara Subbasin.

Llagas Subbasin (Central Coast Region)

In general, groundwater quality throughout the Llagas Subbasin meets the agricultural objectives set by the Central Coast Water Board with a few exceptions. Five parameters are detected above agricultural objectives including bicarbonate, chloride, specific conductance, nitrate, and SAR.

Bicarbonate was measured above the lowest objective of 90 mg/L in all wells tested. However, no wells had bicarbonate above the level at which severe problems would be expected to arise (520 mg/L). Irrigation water high in bicarbonate can cause deposits of calcium carbonate to appear on leaves of plants if overhead sprinklers are used.

Detections of chloride and SAR above established objectives were rare, with only one well affected by chloride and one well affected by adjusted SAR. The location of wells with detections above agricultural objectives in the Llagas Subbasin is depicted graphically on Figure 3-4.

District staff will continue to monitor potential water quality changes that may impact agricultural use. A summary of wells with parameters detected above established agricultural objectives is presented in Table 3-4.

3.3 TREND ANALYSIS

This section provides more detailed information on the trends of chloride, nitrate, and TDS using ten years of data (2002 to 2011). Detailed trend analysis results are available in Appendices B through D. Work currently being conducted to analyze trends for the salt and nutrient management plan suggests that ten years may not adequately capture long-term changes in groundwater quality. The District will re-evaluate alternative approaches to analyzing trends in future annual groundwater quality reports.

3.3.1 CHLORIDE

There are several sources of chloride in the environment. These sources may be naturally occurring such as sea spray in coastal areas, bodies of saline water, connate water, and dissolution of evaporate deposits. Anthropogenic sources include wastewater disposal, recycled water, various industrial processes, and the return of excess irrigation water to groundwater. An increase in chloride concentrations is generally regarded as a deterioration of water quality.

The movement of saline water into a freshwater aquifer constitutes salt water intrusion. Due to high groundwater pumping and land subsidence after World War II, salt water intrusion was observed in the shallow aquifer of the Santa Clara Plain adjacent to the southern shore of the San Francisco Bay. This was mainly caused by the inland migration of saline water through tidal creeks and subsequent transport to groundwater through streambed percolation and downward vertical gradients between shallow and principal zones. Although the intrusion has been somewhat widespread in the shallow aquifer zone, on the basis of historic data, it does not appear that the lower aquifer has been affected significantly.

Each year, the District samples about 70 wells for general water quality parameters, including chloride. Every three years, the District samples additional wells near San Francisco Bay to better constrain and understand the extent and severity of salt water intrusion. This additional monitoring is scheduled to occur in FY 13. Trends in chloride based on data from 2002 to 2011 are discussed below.

Santa Clara Subbasin - Santa Clara Plain

Trends in chloride concentrations were evaluated at 28 shallow aquifer zone wells. The majority of wells in this zone (89%) did not show clear evidence of a trend. Three wells had an upward concentration trend and the average estimated rate of increase is about 1.2 to 82.5 mg/L/year. Two wells had a downward trend and the average estimated rate of decrease is about 1.5 mg/L/year.

The vast majority of principal zone wells (98%) did not show a trend for chloride with only 2 of 107 wells showing significant decreasing trends in chloride concentration. The mean estimated rate of decrease for these sites is about 4 mg/L/year. No wells were found to have an increasing chloride concentration trend.

All wells with a trend in chloride are located in the northern portion of the Santa Clara Plain as shown in Figure 3-5.

Santa Clara Subbasin - Coyote Valley

No trends in chloride were detected at the 15 wells analyzed within the Coyote Valley, as shown in Figure 3-5.

Llagas Subbasin

The majority of wells tested in the shallow zone did not show a trend for chloride (75%). Upward trends in chloride were detected at 5 of 20 wells located within the southern portions of shallow zone in the Llagas Subbasin. The estimated mean rate of increase for these wells is about 2 mg/L/year. No downward trends in chloride content were observed from wells drawing from the shallow aquifer zone.

No trends in chloride were detected at the 33 principal aquifer zone wells tested. Figure 3-5 presents a graphical presentation of trends in the Llagas Subbasin.

3.3.2 NITRATE

Nitrate is a particularly important inorganic parameter in Santa Clara County since it is present above the MCL in a number of wells. The primary sources of nitrate in Santa Clara County include synthetic fertilizers, septic systems, and animal waste. An additional source of nitrate is atmospheric deposition[1]. The area overlying the Santa Clara Plain consists mostly of urban and suburban development and the use of individual septic systems is rare. While once prevalent, only a few pockets of agricultural land remain today. Land use over the Coyote Valley is mixed; the northern portion is predominantly agricultural and the southern portion contains both agricultural use and suburban style residential development. No municipal wastewater collection system exists in much of Coyote Valley, therefore septic systems are common.

Land use over the Llagas Subbasin is mostly mixed agricultural and rural residential development, with two main incorporated areas consisting of the cities of Morgan Hill and Gilroy. While the incorporated areas are served by municipal wastewater systems, the unincorporated areas rely on individual septic systems for sanitary waste disposal. Furthermore, the southern portion of the Llagas Subbasin has significant agricultural production. Past land use also included a number of confined animal enclosures. Thus, most known sources of nitrate are, or have been present, in the Llagas Subbasin.

Santa Clara Subbasin - Santa Clara Plain

None of the 18 shallow aquifer zone wells analyzed for the Santa Clara Plain showed any trend for nitrate. Very little change is observed with regard to nitrate trends from the principal aquifer zone of the Santa Clara Plain since last year with 83% of wells showing no trend. Of the 201 wells tested, 34 (17%) showed evidence of trend; 12 wells had an upward trend and 22 wells had a downward trend. The mean estimated rate of increase for the 12 wells with upward trends is about 0.4 to 1.8 mg/L/year. The mean estimated rate of decrease for the 22 wells with downward trend is 0.7 mg/L/year.

While there were a number of wells with increasing and decreasing trends, the distribution of these wells does not appear to be entirely random. An examination of the spatial location of trends results (Figure 3-7) reveals a few areas with distinct trend pattern. The area north of Metcalf Road, located in the southern portions of the Santa Clara Subbasin, is marked by downward trends in groundwater nitrate concentrations, although the rate of reduction is quite small. The downtown area of San Jose is marked by mostly increasing trends, while the Los Altos/Mountain View/Sunnyvale areas contains a mix with some wells having increasing trends and some decreasing.

Santa Clara Subbasin - Coyote Valley

The majority of wells in Coyote Valley did not indicate any trend for nitrate (73%). Statistically significant groundwater nitrate trends were identified at 8 of 30 (27%) wells analyzed in the Coyote Valley. Two wells had an upward concentration trend and 6 wells had a downward trend. The estimated magnitude of the trend, or rate of increase, for the 2 wells with upward trend was about 2.5 mg/L/year. The mean estimated rate of decrease for the 6 wells with downward trend is slightly less than 1 mg/L/year. In Coyote Valley, most wells with downward trends are clustered along or near Coyote Creek, in the southeasterly portion of the valley. The likely cause of this decrease is the District's managed recharge of local reservoir and imported water, which contains lower nitrate concentrations. Wells with upward trends tend to occur more toward the western side of the valley away from Coyote Creek. Figure 3-7 presents a graphical presentation of nitrate trends in the Santa Clara Subbasin.

[1] Weiss, Stuart, Atmospheric Nitrogen Deposition in the Santa Clara Valley, White Paper prepared for the Loma Prieta Resource Conservation District, 1999.

Llagas Subbasin

Nitrate trends were evaluated at 26 shallow aquifer zone wells. The majority of these wells (81%) did not indicate any trend for nitrate, while at 5 wells (19%) trend results were significant. Three wells had an upward trend and two wells exhibited a decreasing trend. For the three wells having an upward trend, the mean estimated rate of increase is about 4.5 mg/L/year. The mean estimated rate of decrease for wells having a downward trend is about 1 mg/L/year.

Among wells completed in the principal aquifer zone, nitrate trends were detected at 26 of 103 (25%) sites. Five wells had an upward trend and 21 wells had a downward trend. Of the 5 wells having an upward trend, the estimated rate of increase ranged from 0.4 to 2.6 mg/L/year, with a mean rate of about 1 mg/L/year. The mean estimated rate of decrease, for wells having a downward trend, was unchanged since last year at 2.3 mg/L/year. In the Llagas Subbasin, there are no easily discernable patterns of increasing or decreasing nitrate trends. Figure 3-8 presents a graphical presentation of nitrate trends in the Llagas Subbasin.

3.3.3 TOTAL DISSOLVED SOLIDS

Total Dissolved Solids (TDS) is a measure of the combined concentration of all inorganic and organic substances in a water sample. It is a prime indicator of the generally suitability of water, especially for domestic and municipal use. Dissolved solids in groundwater are related to the interaction of water with the atmosphere, soil, and rock. Although not considered a “primary” contaminant (one that is deemed to be associated with health effects), it is used as an indication of the aesthetic characteristic of drinking water. Dissolved solids in groundwater can be artificially elevated due to runoff, soil leaching, and land use.

Santa Clara Subbasin - Santa Clara Plain

Twenty wells representing the shallow aquifer zone of the Santa Clara Plain were analyzed for TDS trend. The majority of wells (75%) did not indicate a trend, with 2 wells having an upward trend and 3 wells having a downward trend. The average estimated rate of decrease for the three wells having a downward trend is 18 mg/L/year. The mean estimated rate of increase of the two wells having an upward trend is 83 mg/L/year. The well exhibiting the greatest rate of increase (122.5 mg/L/year) between 2002 and 2011 is a shallow salt water intrusion monitoring well located adjacent to the Guadalupe River and just south of Highway 237. The fall 2012 sampling event will include additional monitoring near this area; evaluation of this data will help determine if additional action is needed.

Trends in TDS were detected at only 2 of 108 wells (2%) drawing from the principal aquifer zone of the Santa Clara Plain, with 1 well having an upward trend and 1 well having a downward trend. The estimated rate of increase of the well having an upward trend is 9.6 mg/L/year. The estimated rate of decrease for the well having a downward trend is unchanged since last year at 14 mg/L/year. No spatial pattern of trend results is observed. Figure 3-9 presents a graphical presentation of TDS trends in the Santa Clara Subbasin.

Santa Clara Subbasin - Coyote Valley

Most wells in Coyote Valley do not indicate a trend for TDS. A statistically significant upward trend for TDS was detected at 2 of 17 sites. The average rate of increase was estimated at 44 mg/L/year. There were no wells with a statistically significant downward trend in the Coyote Valley Study area. Figure 3-9 presents a graphical presentation of TDS trends in the Santa Clara Subbasin.

Llagas Subbasin

Twenty two wells representing the shallow aquifer zone were analyzed for TDS trend, with 2 wells having an upward trend. The average rate of increase is about 15 mg/L/year. No trends in TDS were detected in 33 wells analyzed which draw water from the principal aquifer zone of the Llagas Subbasin. Figure 3-10 presents a graphical presentation of TDS trends in the Llagas Subbasin.

Table 3-1 Summary of 2011 Inorganic Parameter Data

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain								Santa Clara Subbasin – Coyote Valley				Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
MAJOR AND MINOR IONS																							
Bicarbonate (as HCO3)	mg/L	14	224	326.5	626	58	51	270	480	8	202	243	421	21	133	269	473	26	165	239	437	--	--
Bromate	ug/L	1	<5	<5	<5	1	<5	<5	<5	0	--	--	--	0	--	--	--	0	--	--	--	10	--
Bromide	mg/L	15	<0.05	0.1	3.67	10	<0.05	0.08	0.2	8	<0.05	0.115	0.36	21	-0.05	0.15	0.38	17	<0.05	0.12	0.46	--	--
Calcium	mg/L	14	24.4	63.3	210	58	13.8	63	110	9	7.2	48.9	71.2	21	22.2	58.5	107	27	26.4	53	91.9	--	--
Calcium (as CaCO3)	mg/L	14	61	159	525	9	34.4	93.9	240	8	18.1	124.5	178	21	56.3	146	266	17	66.1	134	230	--	--
Carbon Dioxide	mg/L	0	--	--	--	40	1.3	15	99	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Chlorate	ug/L	1	<20	<20	<20	1	<20	<20	<20	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Chloride	mg/L	14	14	47	1,160	58	10	44.5	100	9	13	36	143	21	9	44	182	27	16	32	99	--	250 (500)
Cyanide	ug/L	0	--	--	--	52	<20	<100	<100	1	<100	<100	<100	0	--	--	--	11	<100	<100	<100	150	--
Fluoride (Natural Source)	mg/L	14	0.06	0.12	0.3	59	<0.1	0.15	0.83	10	0.1	0.13	0.2	21	0.05	0.11	0.24	29	<0.1	0.12	0.37	2	--
Magnesium	mg/L	14	12.1	34.15	173	58	6.2	24	63.0	9	25.1	31.9	60.0	21	15.7	37.6	71.4	27	10.0	28	58.8	--	--
Perchlorate	ug/L	14	<4	<4	<4	73	<4	<4	<4	13	<4	<4	<4	21	<4	<4	<4	122	<2	2.4	8.2	6	--
Potassium	mg/L	14	<0.5	1.15	2.6	49	<1	1.2	3.1	9	0.8	1.2	1.6	21	<0.5	1.0	1.6	18	<0.5	1.2	1.6	--	--
Silica	mg/L	14	18.8	23.1	32.2	9	15.4	25.3	30.5	8	18.9	23.3	38.5	21	16.8	27.0	58.4	17	21.8	26.5	40.8	--	--
Sodium	mg/L	14	22.1	42.6	322	58	14.4	33.4	150	9	17.8	28	110	21	11.6	24.6	94.8	27	15.3	24	97.4	--	--
Sodium Adsorption Ratio (adj)	--	13	0.63	1.01	4.60	56	0.44	0.93	5.85	9	0.6	0.82	3.16	21	0.41	0.77	2.33	27	0.46	0.77	3.18	--	--
Sulfate	mg/L	14	13.0	51.5	175	58	4.2	43	84.0	9	1.4	35.2	58.4	21	13.8	47.1	128	36	3.3	30.5	58.6	--	250 (500)
Total Filterable Residue 180 C (TDS)	mg/L	14	282	451	1,980	58	192	380	890	19	268	359	622	21	170	426	860	27	250	360	618	--	500 (1,000)
NUTRIENTS																							
Nitrate (As NO3)	mg/L	15	<0.05	2.9	24.9	291	<2	15	44.6	45	<0.05	11.7	78.1	21	<0.05	48	164	199	<0.05	21.2	125	45	--
Nitrate + Nitrite (As N)	mg/L	0	--	--	--	39	<0.4	3.00	6.30	0	--	--	--	0	--	--	--	1	3.27	3.27	3.27	10	--
Nitrite (As N)	ug/L	0	--	--	--	48	<200	<200	<400	11	<400	<400	<400	0	--	--	--	19	<400	<400	<400	1,000	--
Phosphate- Ortho	mg/L	14	0.05	0.15	0.83	9	<0.05	0.08	2.1	8	<0.05	0.13	0.39	21	<0.05	0.08	0.66	17	<0.05	<0.05	0.61	--	--

Notes:
1. mg/L = milligrams per liter; ug/L = micrograms per liter; MFL = million fibers per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.

Table 3-1 Summary of 2011 Inorganic Parameter Data (continued)

Parameter	Units[1]	Santa Clara Subbasin -Santa Clara Plain								Santa Clara Subbasin – Coyote Valley				Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
TRACE ELEMENTS																							
Aluminum	ug/L	14	<20	38.56	170	70	<20	33.7	4,700	10	<20	58.5	200	21	<20	23.9	390	29	<20	27.8	1,100	1,000	200
Antimony	ug/L	14	<2	<2	<2	58	<2	<6	<6	9	<2	<2	<6	21	<2	<2	<2	28	<2	<2	<6	6	--
Arsenic	ug/L	14	<2	<2	13	58	<2	<2	6	10	<2	<2	2	21	<2	<2	<2	29	<2	<2	3	10	--
Asbestos	MFL	0	--	--	--	6	<0.2	<0.2	<0.2	0	--	--	--	0	--	--	--	8	<0.2	<0.2	2.7	7	--
Barium	ug/L	14	42.7	130	740	58	23.7	120	280	10	<100	110	290	21	12.9	120	340	29	23.3	110	500	1,000	--
Beryllium	ug/L	14	<1	<1	<1	58	<1	<1	<1	9	<1	<1	<1	21	<1	<1	<1	28	<1	<1	<1	4	--
Boron	ug/L	14	81.7	161	557	9	118	154	389	8	56.5	110	134	21	<50	118	315	17	<50	92.9	197	--	--
Cadmium	ug/L	14	<1	<1	<1	58	<1	<1	<1	10	<1	<1	<1	21	<1	<1	<1	29	<1	<1	<1	5	--
Chromium (Total)	ug/L	14	<1	<1	3.1	61	<1	2.6	12.2	10	<1	1.4	3.56	21	<1	1.1	7.3	29	<1	1.05	1.89	50	--
Chromium-6 (Hexavalent)	ug/L	0	--	--	--	51	<1	1.3	8.1	3	4.3	4.6	4.8	0	--	--	--	2	<1	<1	<1	--	--
Cobalt	ug/L	14	<2	<2	<2	9	<2	<2	<2	8	<2	<2	<2	21	<2	<2	<2	17	<2	<2	<2	--	--
Copper	ug/L	14	-2	2.2	8.2	58	<2	<2	2.46	9	<2	<2	6.2	21	<2	2.2	15.8	27	<2	<2	10.7	--	1,000
Iron	ug/L	14	<20	41.4	3,000	103	<20	62.3	4,000	9	<20	13.0	160	21	<20	<20	400	29	<20	41.3	840	--	300
Lead	ug/L	14	<2	<2	<2	51	<2	<5	<5	10	<2	<2	<5	21	<2	<2	<2	29	<2	<2	<5	15	--
Lithium	ug/L	14	<5	6.1	17	9	<5	5.5	28	8	6.8	10	15	21	<5	7.1	29	17	<5	8.9	27	--	--
Manganese	ug/L	14	<2	42.1	1,370	72	<2	12.5	240	9	<2	20.6	347	21	<2	<2	340	30	<2	7.8	120	--	50
Mercury	ug/L	0	--	--	--	49	<1	<1	<1	2	<1	<1	<1	0	--	--	--	12	<1	<1	<1	2	--
Molybdenum	ug/L	14	<5	<5	36	9	<5	<5	10	8	<5	<5	8	21	<5	<5	<5	17	<5	<5	6.9	--	--
Nickel	ug/L	14	<2	<2	2.9	58	<2	<2	<10	10	<2	<2	<10	21	<2	<2	12	29	<2	<2	5.69	100	--
Selenium	ug/L	14	<5	<5	<5	58	<5	<5	7.5	10	<5	<5	<5	21	<5	<5	9	29	<5	<5	<5	50	--
Silver	ug/L	14	<2	<2	<2	58	<2	<2	<10	9	<2	<2	<10	21	<2	<2	<2	27	<2	<2	<10	--	100
Thallium	ug/L	14	<1	<1	<1	58	<1	<1	<1	9	<1	<1	<1	21	<1	<1	<1	28	<1	<1	<1	2	--
Vanadium	ug/L	14	<3	<3	3.9	9	<3	<3	4.8	8	<3	<3	10	21	<3	<3	15	17	<3	<3	8.9	--	--
Zinc	ug/L	14	<10	<10	56	58	<10	<50	77	9	<10	<10	253	21	<10	<10	26.2	27	<10	18.3	90	--	5,000

Notes:
1. mg/L = milligrams per liter; ug/L = micrograms per liter; MFL = million fibers per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.

Table 3-2 Inorganic Parameters Detected above Drinking Water Standards in 2011

Parameter[1]	Number of Wells Analyzed	Number of Wells Above MCL[2]	Number of Wells Above SMCL[3]	MCL	SMCL[3]
Santa Clara Subbasin Santa Clara Plain – Shallow Aquifer Zone[4]					
Arsenic (mg/L)	13	1		10	
Chloride (mg/L)	13	--	1 (1)	--	250 (500)
Iron (ug/L)	13	--	1	--	300
Manganese (mg/L)	13	--	6	--	50
Total Dissolved Solids (mg/L)	13	--	6 (1)	--	500 (1,000)
Santa Clara Subbasin Santa Clara Plain – Principal Aquifer Zone[5]					
Aluminum (ug/L)	60	3	5	1,000	200
Iron (ug/L)	67	--	10	--	300
Manganese (ug/L)	61	--	8	--	50
Total Dissolved Solids (mg/L)	56	--	12 (0)	--	500 (1,000)
Santa Clara Subbasin Coyote Valley					
Manganese (ug/L)	9	--	1	--	50
Nitrate (mg/L)	24	3	--	45	--
Total Dissolved Solids (mg/L)	11	--	1 (0)	--	500 (1,000)
Llagas Subbasin – Shallow Aquifer Zone					
Aluminum (ug/L)	21	--	1	1,000	200
Iron (ug/L)	21	--	1		300
Manganese (ug/L)	21	--	3		50
Nitrate (mg/L)	21	11	--	45	--
Total Dissolved Solids (mg/L)	21	--	8 (0)	--	500 (1000)
Llagas Subbasin – Principal Aquifer Zone					
Aluminum (ug/L)	29	1	1	1,000	200
Iron (ug/L)	28		2		
Manganese (ug/L)	28	--	2	--	50
Nitrate (mg/L)	64	5	--	45	--
Perchlorate (ug/L)	47	2	--	6	--
Total Dissolved Solids (mg/L)	27	--	2 (0)	--	500 (1,000)

Notes:

1. ug/L = micrograms per liter; mg/L = micrograms per liter.
2. MCL = Maximum Contaminant Level, or health-based standard, set by the California Department of Public Health (CDPH).
3. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, set by the CDPH or EPA. For SMCLs given as a range, the lower, recommended threshold is listed first, with the upper threshold shown in parentheses. The number of wells with detections above the recommended threshold is listed, with the number of wells with detections above the upper threshold shown in parentheses.
4. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

Table 3-3 Basin Plan Agricultural Objectives for Inorganic Parameters

Parameter	Units	San Francisco Bay Region[1]	Central Coast Region[2]
Aluminum	ug/L	5,000	5,000
Ammonium	mg/L	--	5
Arsenic	ug/L	100	100
Bicarbonate[3]	mg/L	--	90
Beryllium	ug/L	100	100
Boron	ug/L	500	500
Cadmium	ug/L	10	10
Chloride	mg/L	142	106[4]
Chromium	ug/L	100	100
Cobalt	ug/L	50	50
Copper	ug/L	200	200
Fluoride	ug/L	1,000	1,000
Iron	ug/L	5,000	5,000
Lead	ug/L	5,000	5,000
Lithium	ug/L	--	2,500
Manganese	ug/L	200	200
Molybdenum	ug/L	10	10
Nickel	ug/L	200	200
Nitrate + Nitrite as N[5]	mg/L	5	--
Nitrate as N	mg/L	--	5
Selenium	ug/L	--	20
Sodium Adsorption Ratio (adj.)	--	3	3
Vanadium	ug/L	100	100
Zinc	ug/L	2,000	2,000

Notes:

1. Agricultural objectives shown are threshold values from the San Francisco Bay Basin Plan (Table 3-6), except as noted.
2. Agricultural objectives shown are based on the maximum concentration for irrigation supply per Central Coast Basin Plan Table 3-4 (Water Quality Objectives for Agricultural Water Use) and Table 3-3 (Guidelines for Interpretation of Quality of Water for Irrigation), except as noted. If a parameter is listed in both tables, the lowest threshold is used.
3. The bicarbonate objective applies only to irrigation with overhead sprinklers.
4. The chloride objective represents the low end of the range for “increasing problems” for toxicity from foliar adsorption from Central Coast Basin Plan Table 3-3.
5. The limit of 5 mg/L as N is equivalent to 22.5 mg/L nitrate as NO3 if nitrite is not present.

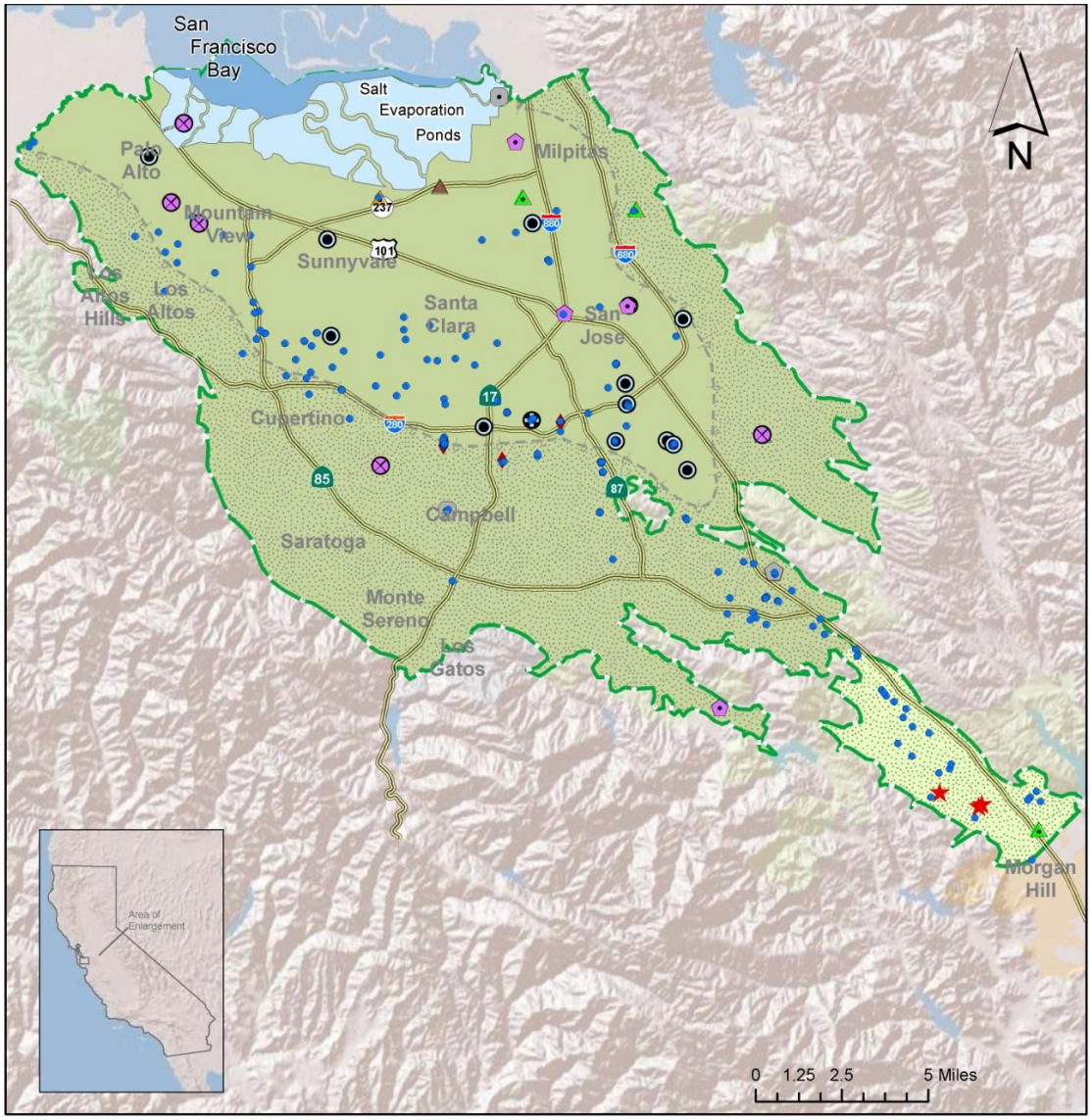
Table 3-4 Inorganic Parameters Detected above Agricultural Objectives in 2011

Parameter	Number of Wells Analyzed	Number of Wells Above Threshold
Santa Clara Subbasin Santa Clara Plain – Shallow Aquifer Zone		
Boron	13	1
Chloride	13	1
Manganese	13	3
Molybdenum	13	3
Nitrate[1]	14	1[2]
SAR (adjusted)	13	3
Santa Clara Subbasin Santa Clara Plain – Principal Aquifer Zone		
Manganese	61	2
Nitrate[1]	155	35[2]
Nitrate + Nitrite as N	38	5
SAR (adjusted)	56	3
Santa Clara Subbasin Coyote Valley		
Chloride	9	1
Manganese	9	1
Nitrate[1]	24	10[2]
SAR (adjusted)	9	1
Llagas Subbasin – Shallow Aquifer Zone		
Bicarbonate	21	21
Chloride	21	1
Manganese	21	1
Nitrate[1]	21	14[2]
Llagas Subbasin – Principal Aquifer Zone		
Bicarbonate	26	26
Nitrate[1]	64	31[2]
SAR (adjusted)	27	1

Notes:

1. No Individual agricultural objective is established for nitrate. However standalone nitrate analysis can be compared against the limit established for Nitrate + Nitrite as N. Any well with a nitrate concentration greater than 22.5 mg/L as NO3 (approximately equal to 5 mg/L as N) can be assumed to exceed the limit set for “Nitrate + Nitrite as N.”
2. Number of wells exceeding limit set for Nitrate + Nitrite as N due only to nitrate. The limit of 5 mg/L as N (the agricultural objective for Nitrate + Nitrate as N) is equivalent to 22.5 mg/L Nitrate as NO3

Figure 3-1 Wells with Inorganic Parameters Detected Above Drinking Water Standards in 2011, Santa Clara Subbasin



Legend

Detection Above Secondary MCLs Due To:

- Al, Fe
- Iron
- Cl, Mn, TDS
- Fe, Mn
- Mn, TDS
- Mn
- TDS

Detection Above Primary MCLs Due To:

- Nitrate

Detection Above Both Primary and Secondary MCLs Due To:

- Aluminum
- Aluminum , Iron
- Arsenic, Manganese

Approximate Extent Confined Area

Santa Clara Plain Confined Area

Santa Clara Plain Recharge Area

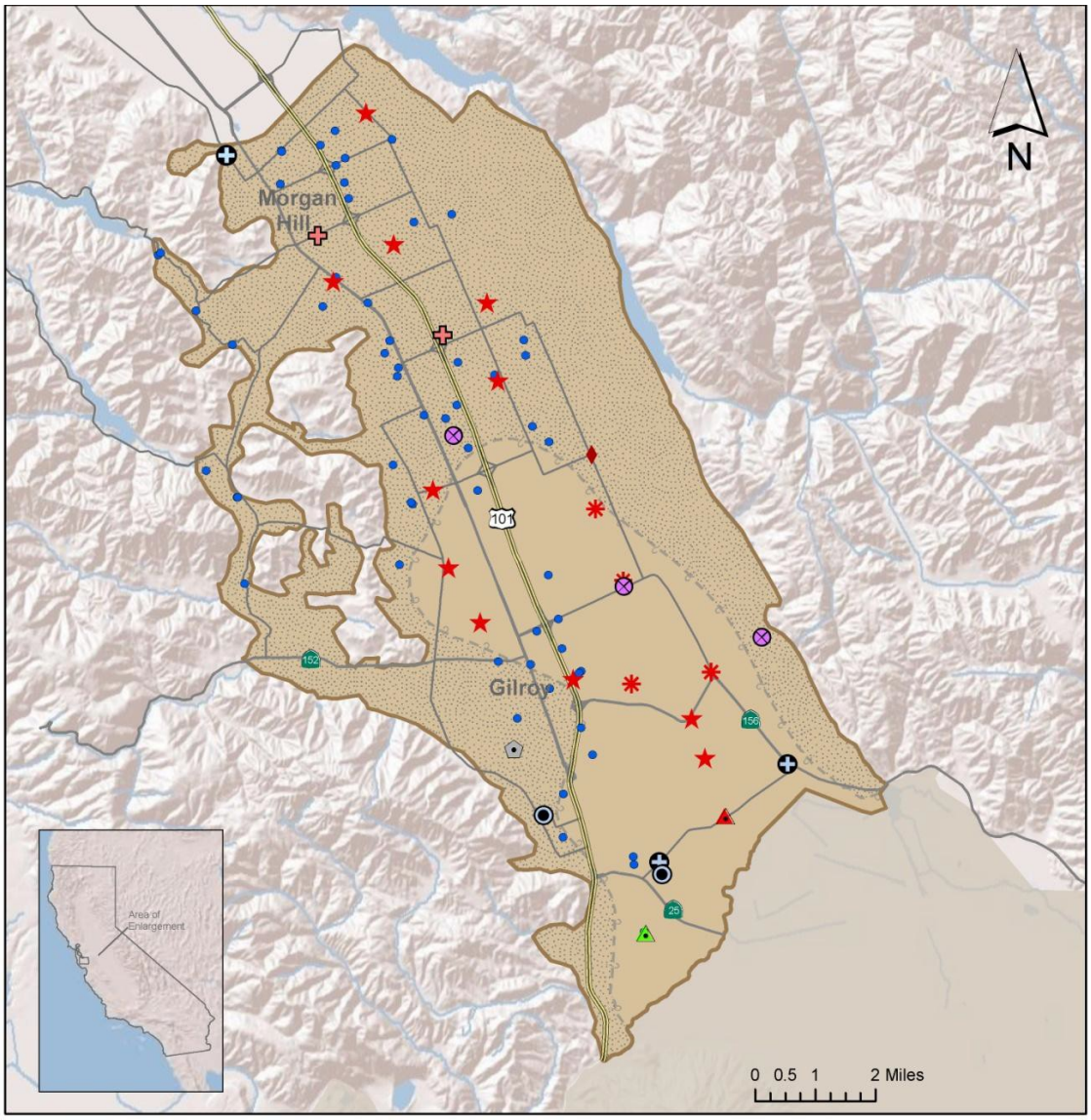
Coyote Valley Recharge Area

Santa Clara Subbasin (DWR Basin 2-9.02)

Al = Aluminum, Cl = Chloride, Fe = Iron, Mn = Manganese, TDS = Total Dissolved Solids

Well Does not Exceed Primary or Secondary MCLs

Figure 3-2 Wells with Inorganic Parameters Detected Above Drinking Water Standards in 2011, Llagas Subbasin



Legend

Detection Above Secondary MCLs Due To:
- Al, Fe
- Iron
- Manganese
- Manganese, TDS
- TDS

Detection Above Primary MCLs Due To:
- Nitrate
- Perchlorate

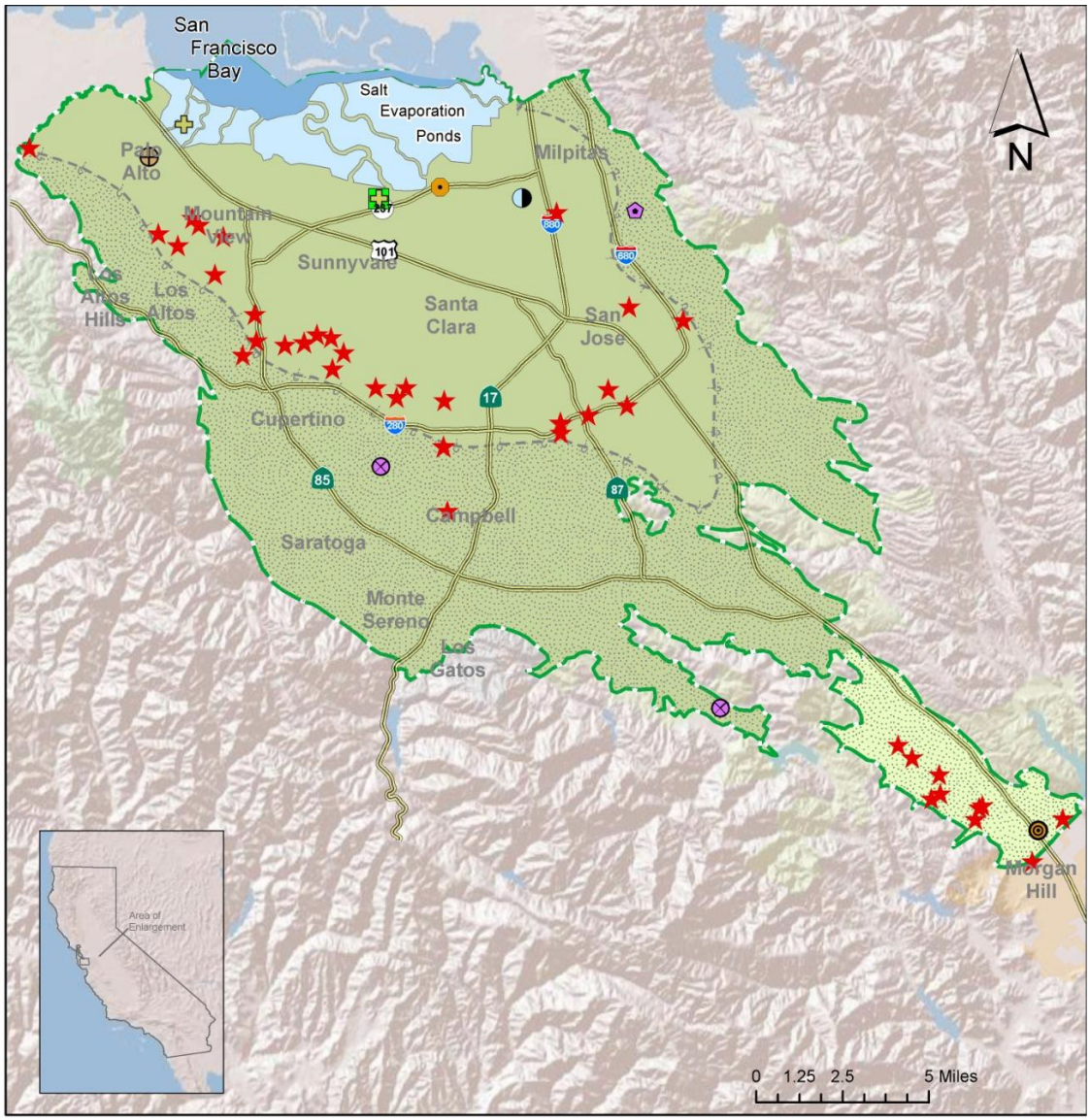
Detection Above Both Primary and Secondary MCLs Due To:
- Al, Fe
- NO3, TDS
- NO3, Mn, TDS

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Llagas Subbasin (DWR Basin 3-3.01)

Al = Aluminum, Fe = Iron, NO3 = Nitrate, Mn = Manganese, TDS = Total Dissolved Solids

• Well Does Not Exceed Primary or Secondary MCLs

Figure 3–3 Wells with Inorganic Parameters Detected Above Agricultural Objectives, Santa Clara Subbasin



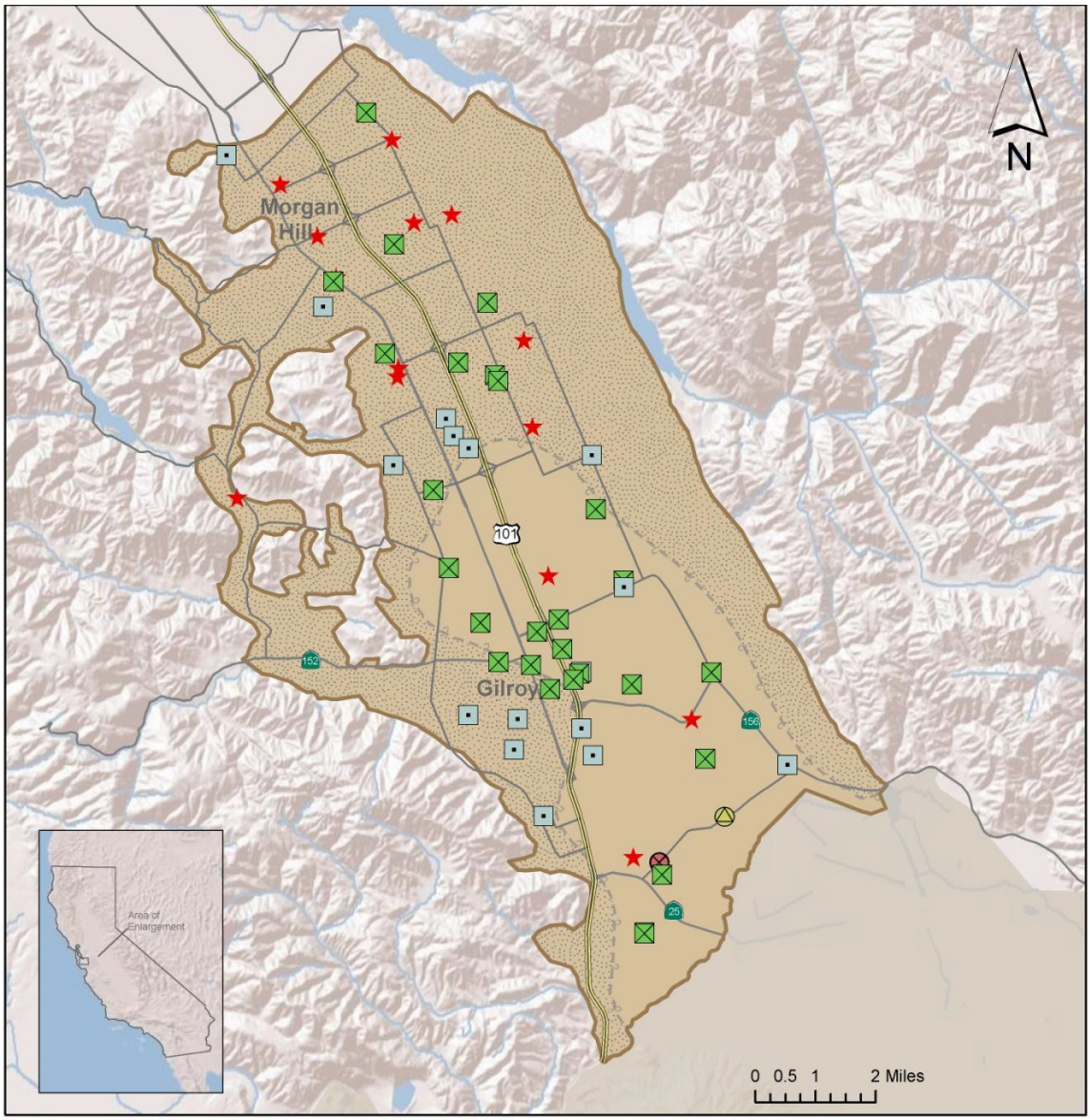
Legend

Detection Above Agricultural Objectives (SF Region) Due To:

- Boron, Manganese, SAR
- Cl, Mn, Mo, SAR
- Cl, Mn, SAR
- Mn
- Mn, NO3, SAR
- Molybdenum
- Mo, SAR
- NO3
- SAR
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area

Cl = Chloride, Mo = Molybdenum, Mn = Manganese, NO3 = Nitrate, SAR = Sodium Adjusted Ratio (adjusted)

Figure 3–4 Wells with Inorganic Parameters Detected Above Agricultural Objectives, Llagas Subbasin



Legend

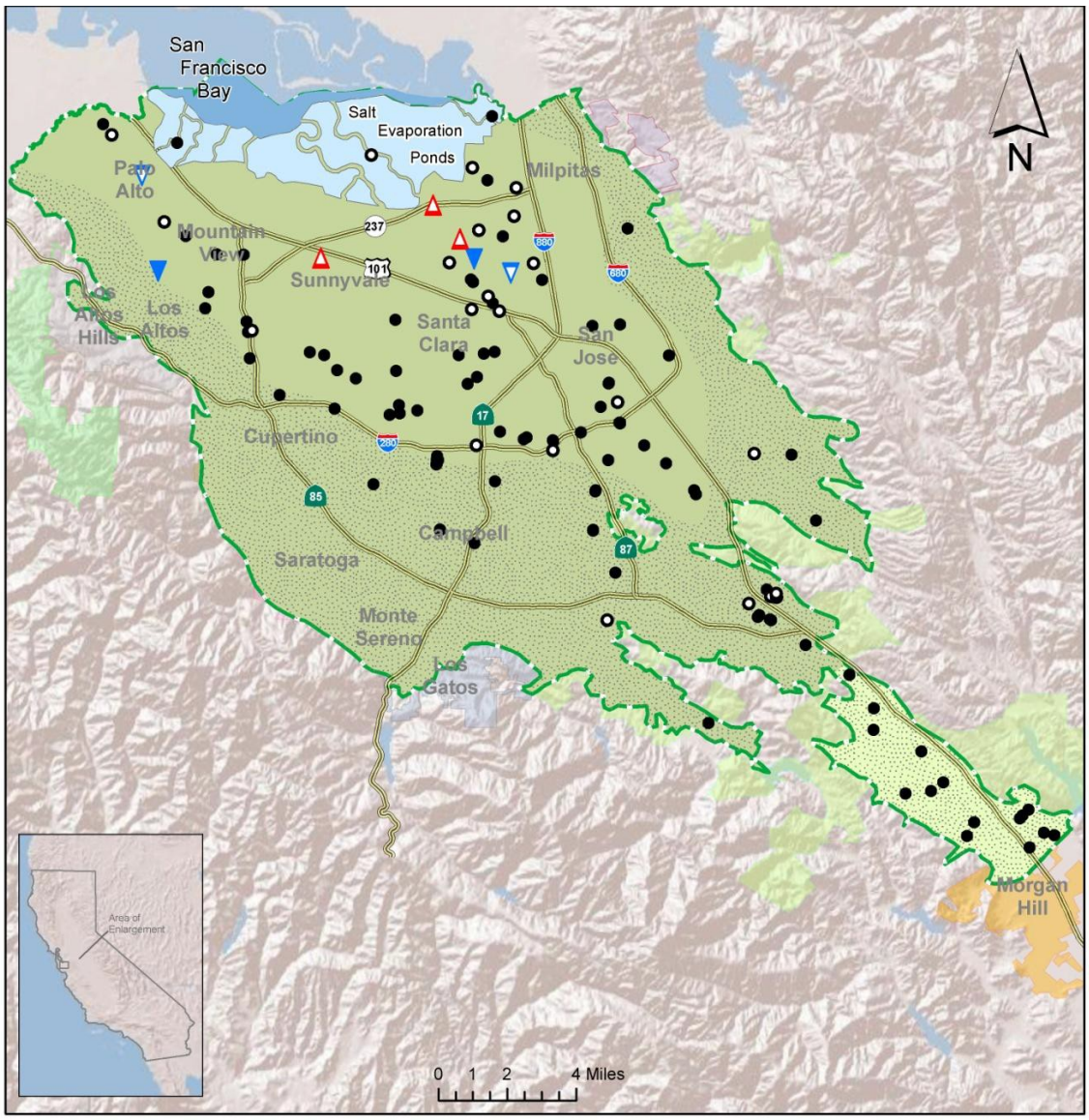
Detection Above
Agricultural Objectives (Central Coast Region)
Due To:

- HCO3
- HCO3, NO3
- HCO3, Cl, NO3
- HCO3, Mn, NO3
- Nitrate

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

Cl = Chloride, HCO3 = Bicarbonate, NO3 = Nitrate, Mn = Manganese, TDS = Total Dissolved Solids

Figure 3-5 Chloride Trends in Groundwater (2002-2011), Santa Clara Subbasin

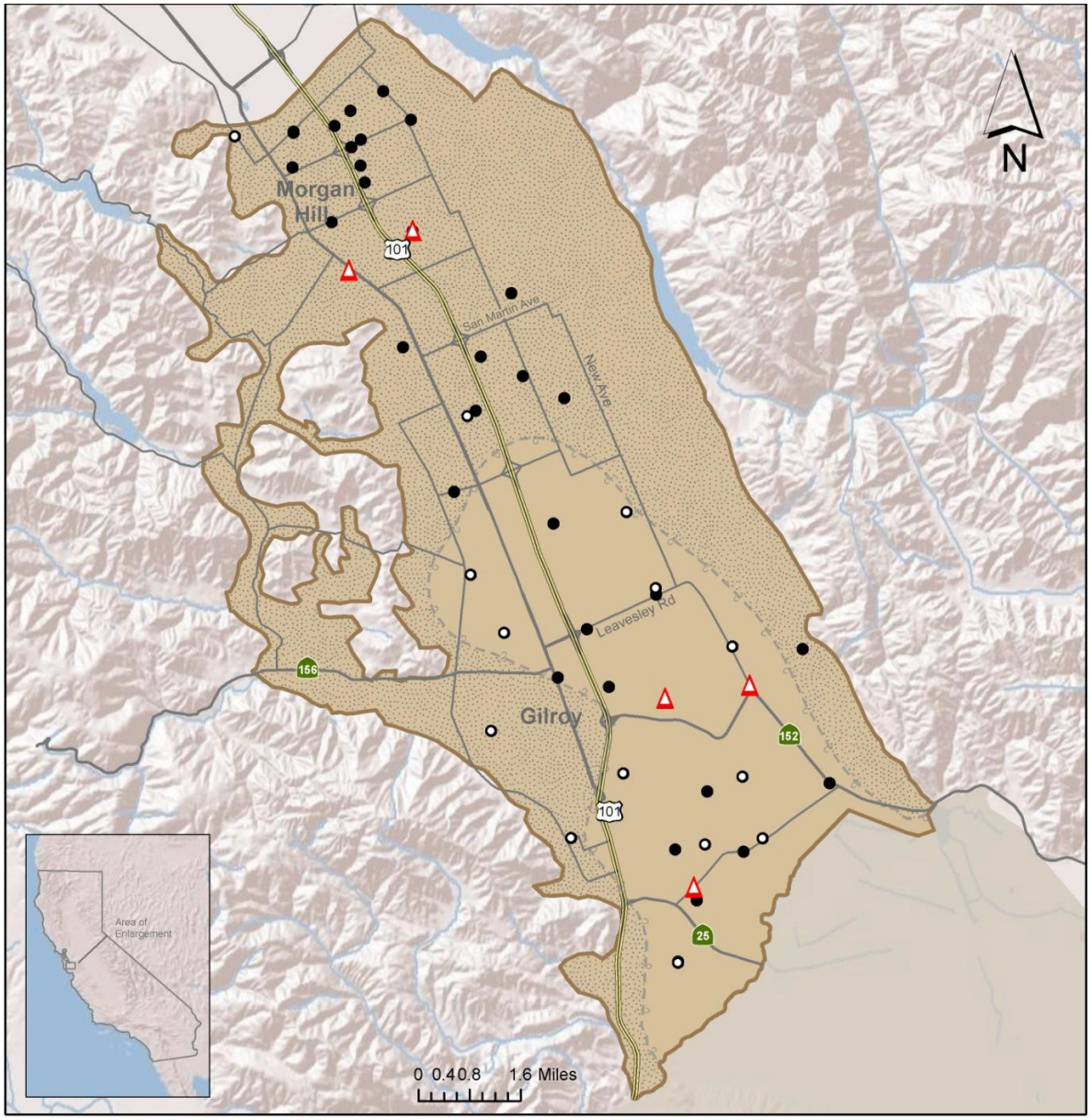


Legend

Chloride Trends

- Increase Shallow Aquifer Zone
- Decrease Shallow Aquifer Zone
- No Trend Principal Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Shallow Aquifer Zone
- Santa Clara Plain Confined Area
- Coyote Valley Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area
- Santa Clara Plain Recharge Area

Figure 3-6 Chloride Trends in Groundwater (2002-2011), Llagas Subbasin



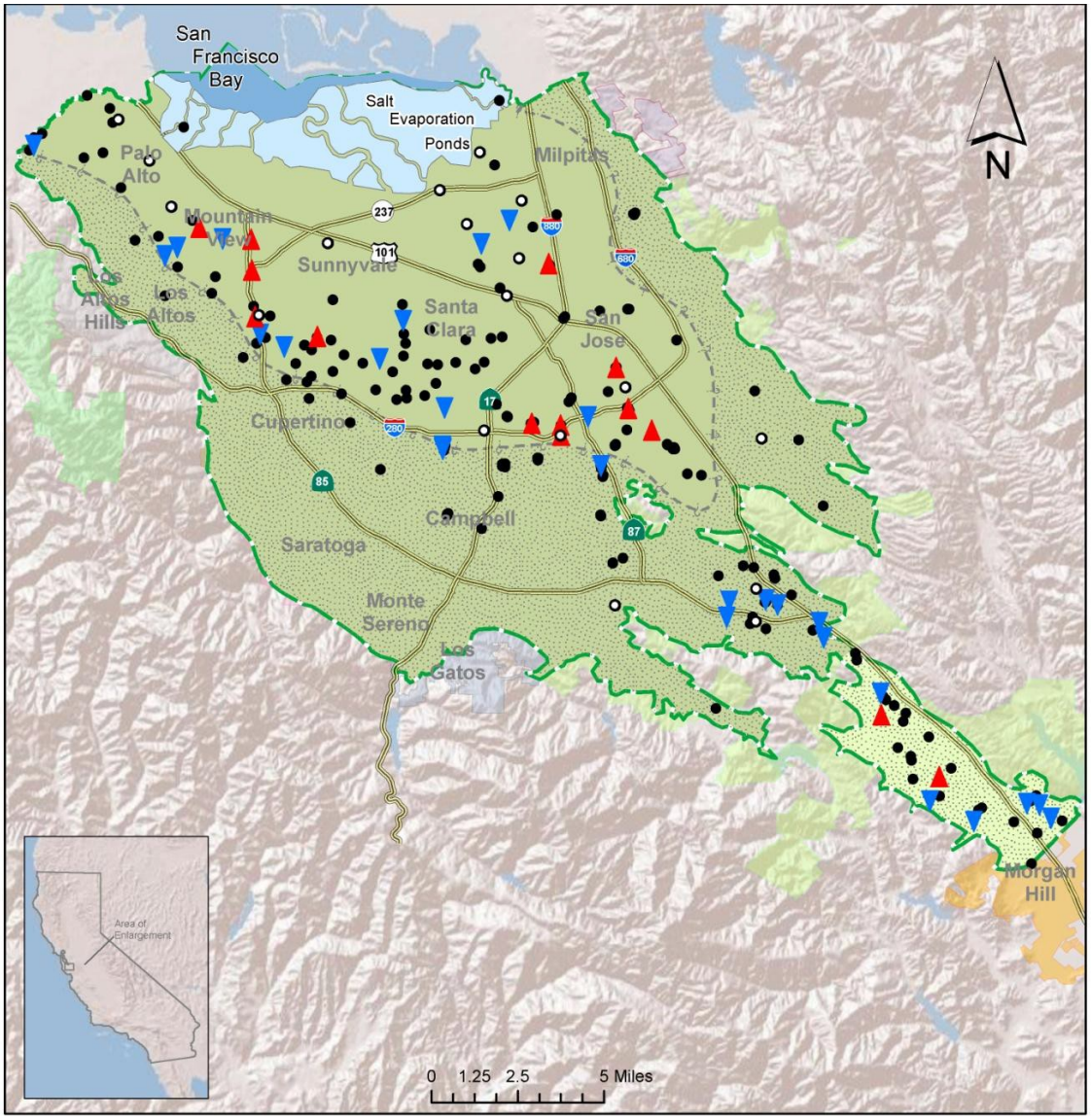
Legend

Chloride Trends

- Increase Shallow Aquifer Zone
- Decrease Shallow Aquifer Zone
- No Trend Principal Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Shallow Aquifer Zone

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

Figure 3-7 Nitrate Trends in Groundwater (2002-2011), Santa Clara Subbasin

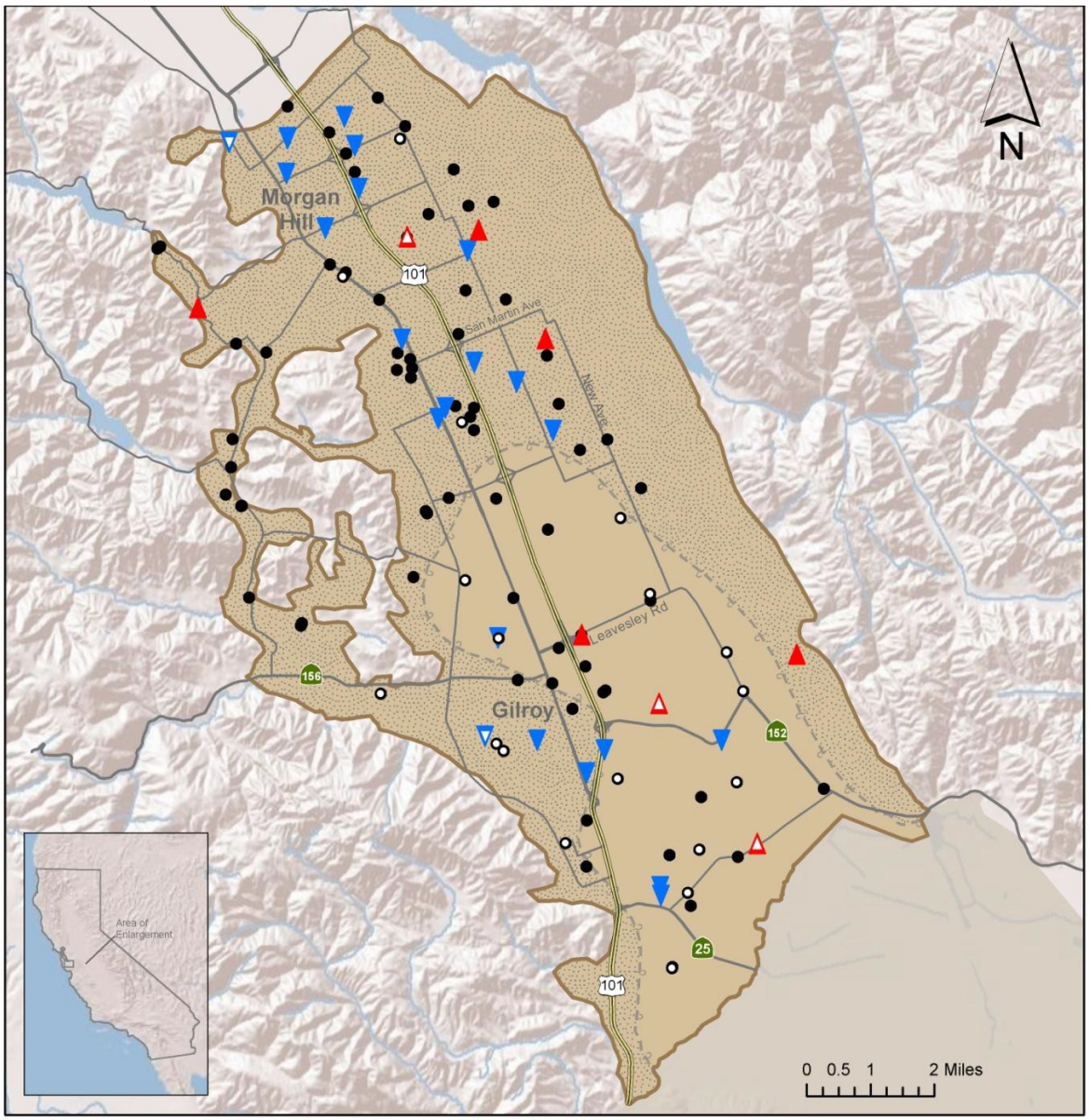


Legend

Nitrate Trends

- Increase Shallow Aquifer Zone
- Decrease Shallow Aquifer Zone
- No Trend Principal Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Shallow Aquifer Zone
- Santa Clara Plain Confined Area
- Coyote Valley Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area
- Santa Clara Plain Recharge Area

Figure 3-8 Nitrate Trends in Groundwater (2002-2011), Llagas Subbasin



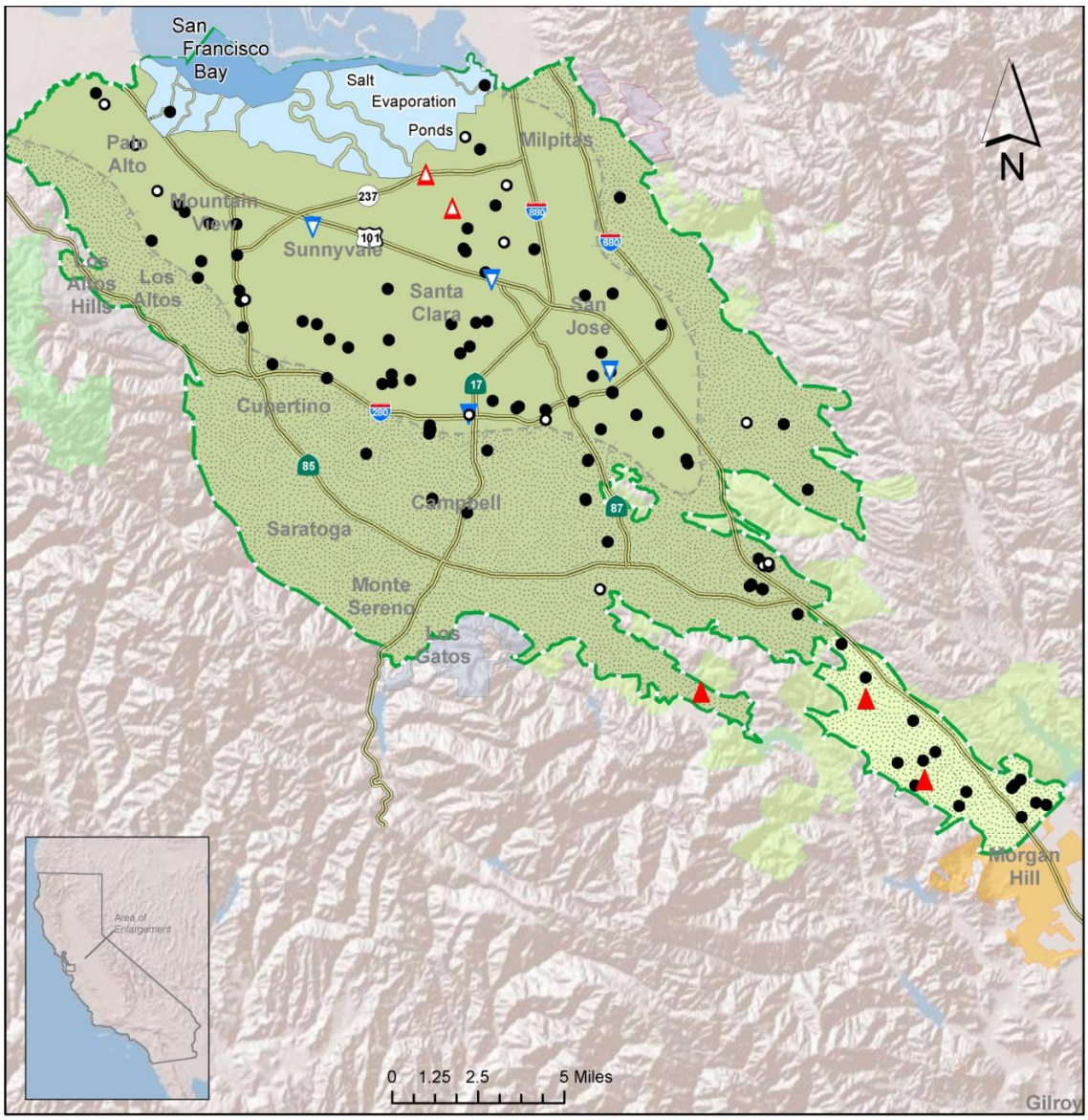
Legend

Nitrate Trends

- Increase Shallow Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Shallow Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Principal Aquifer Zone
- No Trend Shallow Aquifer Zone

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

Figure 3-9 Total Dissolved Solids Trends in Groundwater (2002-2011), Santa Clara Subbasin

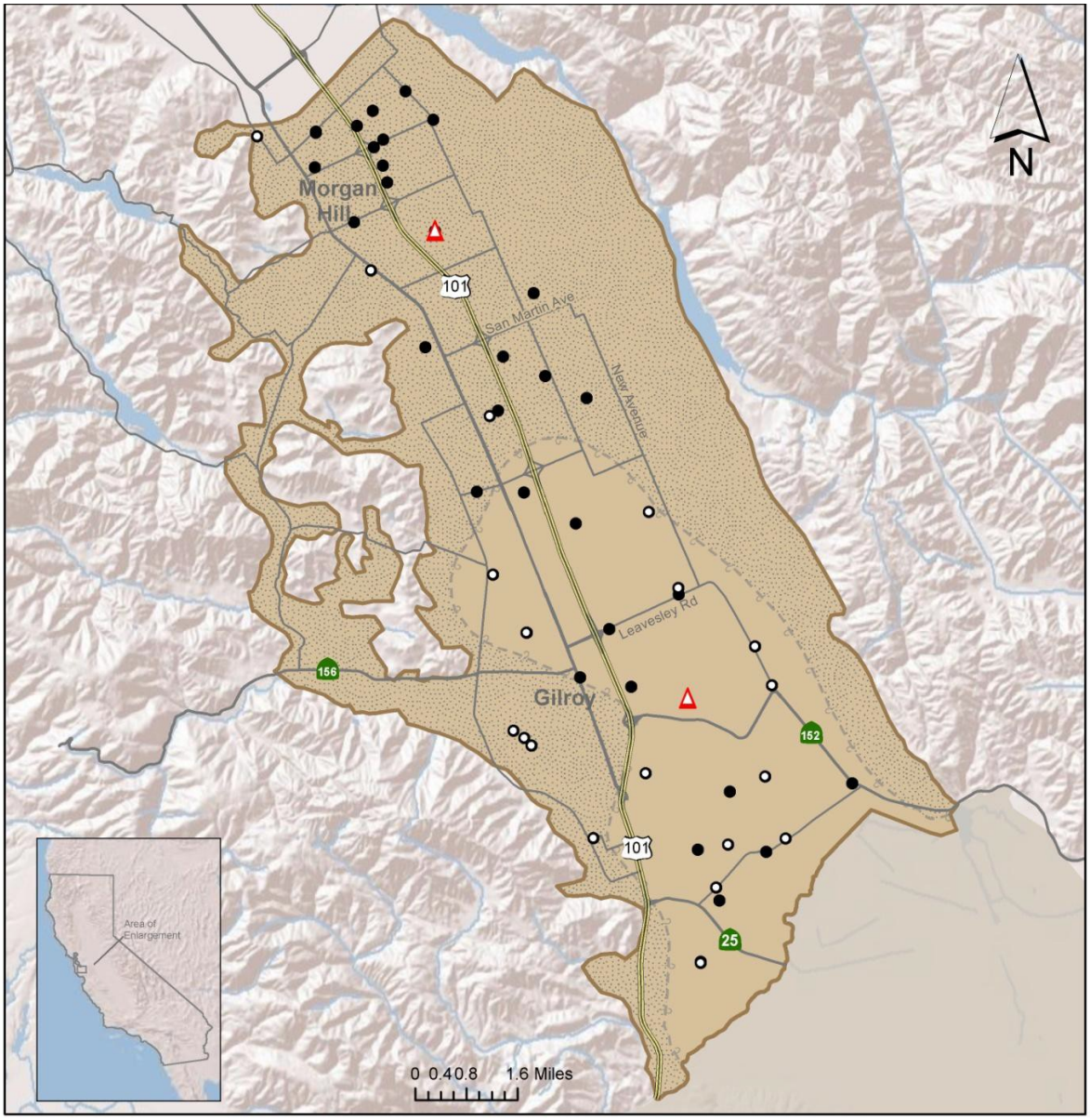


Legend

TDS Trends

- Increase Shallow Aquifer Zone
- Decrease Shallow Aquifer Zone
- No Trend Principal Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Shallow Aquifer Zone
- Santa Clara Plain Confined Area
- Coyote Valley Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Approximate Extent Confined Area
- Santa Clara Plain Recharge Area

Figure 3-10 Total Dissolved Solids Trends in Groundwater (2002-2011), Llagas Subbasin



Legend

TDS Trends

- Increase Shallow Aquifer Zone
- Decrease Shallow Aquifer Zone
- No Trend Principal Aquifer Zone
- Increase Principal Aquifer Zone
- Decrease Principal Aquifer Zone
- No Trend Shallow Aquifer Zone
- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

4 2011 GROUNDWATER QUALITY REPORT
Organic and Radioactive Parameters

4.1 ORGANIC PARAMETERS

Volatile Organic Compounds

Volatile organic compounds (VOCs) are used in everyday life in products such as paints, solvents, motor fuel, fuel additives, fumigants, and refrigerants. A total of 82 individual VOCs were analyzed in groundwater samples in Santa Clara County in 2011. Twenty five other non-volatile or semi-volatile organic compounds have been grouped together with the VOCs for practical purposes. These include polycyclic aromatic hydrocarbons (PAHs), plasticizers, explosives, and feedstock chemicals used for the manufacture of various other chemical compounds and products. For simplicity, all 107 chemical compounds described here are referred to as VOCs in this report. A summary of the 2011 monitoring results for these compounds is in Table 4-1.

Of these 107 VOCs, 96 were not detected in any samples. Eleven VOCs were present above laboratory detection limits, although all detections were below MCLs and SMCLs. Table 4-2 presents the number of results with detections as well as summary statistics including the minimum, median, and maximum for each subbasin and zone. Table 4-3 summarizes the number of wells where VOCs were detected, how many wells were tested for each VOC, the maximum concentration found, and the drinking water standard, if applicable.

Pesticides

Pesticides include herbicides, insecticides, and fungicides and are used to control weeds, insects, fungi and other pests in the agricultural, suburban, and urban environments. No pesticides were detected above laboratory detection limits or MCLs or SMCLs. The 2011 monitoring results for 79 pesticides and pesticide degradation products are summarized in Table 4-4.

4.2 RADIOACTIVE CONSTITUENTS

Radioactivity is the release of energy or energetic particles resulting from the rearrangement of the structure of the nucleus of certain atoms. The decay of the isotopes of uranium and thorium present in natural deposits results in most of the radioactivity in groundwater. Each step in the decay series results in the release of alpha or beta particles, or radiation. Radioactivity is commonly measured in units of “activity” rather than concentration. The unit of activity is picocuries per liter (pCi/L) and is roughly equivalent to two atoms decaying per minute. For certain types of ionizing radiation, the traditional unit of measurement is the radiation dose equivalent called roentgen equivalent in mammals, or rems per year.

Radium-226 and Radium-228 are radioactive isotopes that are hazardous to human health as they can damage cell structure. These isotopes have a combined MCL of 5 pCi/L. Activity of gross alpha radiation was below the health-based threshold of 15 pCi/L in all wells tested. Activity counts ranged from a low of 0.02 pCi/L to a high of 6.33 pCi/L. The median activity of alpha radiation, in the Santa Clara Plain principal aquifer zone where the highest activities were measured, is estimated at 2.35 pCi/L. Gross beta and radium-228 activities were below their respective MCLs in all wells tested for these constituents. Results for radioactive parameters tested in 2011 are summarized in Table 4-5 along with comparison thresholds.

Table 4-1 Summary of 2011 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
1,1,1,2-Tetrachlorethane	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,1,1-Trichloroethane	ug/L	4	D	<0.5	98	D	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	200	--
1,1,2,2-Tetrachloroethane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	1	--
1,1,2-Trichloro,1,2,2-Trifluoroethane (Freon 113)	ug/L	4	ND	<10	98	D	<10	3	ND	<10	0	--	--	33	ND	<10	1,200	--
1,1,2-Trichloroethane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
1,1-Dichloroethane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
1,1-Dichloroethylene	ug/L	4	ND	<0.5	98	D	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	6	--
1,1-Dichloropropene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,2,3-Trichlorobenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,2,3-Trichloropropane	ug/L	1	ND	<0.5	26	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
1,2,4-Trichlorobenzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
1,2,4-Trimethylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,2-Dichlorobenzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	600	--
1,2-Dichloroethane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	0.5	--
1,2-Dichloropropane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
1,3,5-Trimethylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,3-Dichlorobenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,3-Dichloropropane	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
1,3-Dichloropropene (Total)	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	0.5	--
1,4-Dichlorobenzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
1-Phenylpropane (N,Propylbenzene)	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
2,2-Dichloropropane	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
2,4-Dinitrotoluene	ug/L	0	--	--	8	ND	<0.1	4	ND	<0.1	0	--	--	0	--	--	--	--
2-Chlorotoluene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
4-Chlorotoluene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-1 Summary of 2011 Volatile Organic Compound (VOC) Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Acenaphthene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
Acenaphthylene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
Anthracene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
Benzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	1	--
Benzo (A) Anthracene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Benzo (A) Pyrene	ug/L	1	ND	<0.1	33	ND	<0.1	5	ND	<0.1	0	--	--	18	ND	<0.1	0.2	--
Benzo (B) Fluoranthene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Benzo (GHI) Perylene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Benzo (K) Fluoranthene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Benzyl Butyl Phthalate	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Bromobenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Bromochloroacetic Acid (BCAA)	ug/L	0	--	--	3	ND	<1	0	--	--	0	--	--	0	--	--	--	--
Bromochloromethane	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Bromodichloromethane (THM)	ug/L	4	ND	<1	26	D	<1	3	ND	<1	0	--	--	33	D	<1	--	--
Bromoform (THM)	ug/L	4	ND	<1	26	D	<1	3	ND	<1	0	--	--	33	D	<1	--	--
Bromomethane	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Carbon Disulfide	ug/L	3	ND	<0.5	12	ND	<0.5	3	ND	<0.5	0	--	--	0	--	--	--	--
Carbon Tetrachloride	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	0.5	--
Chloroethane	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Chloroform (THM)	ug/L	4	ND	<1	26	D	<1	3	ND	<1	0	--	--	33	D	<1	--	--
Chloromethane	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Chrysene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Cis-1,2-Dichloroethylene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	6	--
Di(2-Ethylhexyl)Adipate	ug/L	1	ND	<0.5	33	ND	<5	5	ND	<5	0	--	--	18	ND	<5	400	--
Di(2-Ethylhexyl)Phthalate	ug/L	1	D	NA	33	D	<3	5	ND	<3	0	--	--	18	ND	<3	4	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-1 Summary of 2011 Volatile Organic Compound (VOC) Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Dibenzo (A-H) Antracene	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Dibromoacetic Acid (DBAA)	ug/L	0	--	--	4	ND	<1	0	--	--	0	--	--	0	--	--	--	--
Dibromochloromethane (THM)	ug/L	4	ND	<1	26	ND	<1	3	ND	<1	0	--	--	33	D	<1	--	--
Dibromochloropropane (DBCP)	ug/L	13	ND	<0.01	26	ND	<0.01	13	ND	<0.01	21	ND	<0.01	17	ND	<0.01	0.2	--
Dibromomethane	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Dichloroacetic Acid (DCAA)	ug/L	0	--	--	4	ND	<1	0	--	--	0	--	--	0	--	--	--	--
Dichlorodifluoromethane (Freon 12)	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Dichloromethane	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
Diethyl Phthalate	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Diisopropyl Ether	ug/L	4	ND	<3	13	ND	<3	3	ND	<3	0	--	--	33	ND	<3	--	--
Dimethyl Phthalate	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Di-N-Butylphthalate	ug/L	1	D	NA	1	D	NA	0	--	--	0	--	--	0	--	--	--	--
Di-N-Octylphthalate	ug/L	1	ND	<5	1	ND	<5	0	--	--	0	--	--	0	--	--	--	--
Ethylbenzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	300	--
Ethylene Dibromide (EDB)	ug/L	13	ND	<0.02	26	ND	<0.02	13	ND	<0.02	0	--	--	17	ND	<0.02	0.05	--
Ethyl-Tert-Butyl Ether	ug/L	4	ND	<3	13	ND	<3	3	ND	<3	0	--	--	33	ND	<3	--	--
Fluoranthene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
Fluorene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
HAA5 - Haloacetic Acids (Five) (HAA5)	ug/L	0	--	--	4	ND	<2	0	--	--	0	--	--	0	--	--	60	--
Hexachlorobutadiene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Isophorone	ug/L	1	ND	<0.5	1	ND	<0.5	0	--	--	0	--	--	0	--	--	--	--
Isopropylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Methyl Ethyl Ketone (Mek- Butanone)	ug/L	3	ND	<5	16	ND	<5	3	ND	<5	0	--	--	33	ND	<5	--	--
Methyl Isobutyl Ketone	ug/L	3	ND	<5	24	ND	<5	3	ND	<5	0	--	--	33	ND	<5	--	--
Methyl-Tert-Butyl-Ether (MTBE)	ug/L	4	ND	<3	98	ND	<3	3	ND	<3	0	--	--	33	ND	<3	13	5

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-1 Summary of 2011 Volatile Organic Compound (VOC) Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Monobromoacetic Acid (MBAA)	ug/L	0	--	--	4	ND	<1	0	--	--	0	--	--	0	--	--	--	--
Monochloroacetic Acid (MCAA)	ug/L	0	--	--	4	ND	<2	0	--	--	0	--	--	0	--	--	--	--
Monochlorobenzene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
M,P-Xylene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Naphthalene	ug/L	5	ND	<0.5	26	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
N-Butylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
O-Xylene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
PCB-1016	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1221	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1232	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1242	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1248	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1254	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	0.5	--
PCB-1260	ug/L	0	--	--	15	ND	<0.5	5	ND	<0.5	0	--	--	0	--	--	--	--
Phenanthrene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
P-Isopropyltoluene	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	--	--	0	--	--	--	--
Polychlorinated Biphenyls (Total PCBs)	ug/L	14	ND	<0.5	27	ND	<0.5	13	ND	<0.5	21	ND	<0.5	35	ND	<0.5	0.5	--
Pyrene	ug/L	1	ND	<0.25	1	ND	<0.25	0	--	--	0	--	--	0	--	--	--	--
Sec-Butylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Styrene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	100	--
Tert-Amyl-Methyl Ether	ug/L	4	ND	<3	13	ND	<3	3	ND	<3	0	--	--	33	ND	<3	--	--
Tert-Butyl Alcohol	ug/L	1	ND	<2	1	ND	<2	0	--	--	0	--	--	33	ND	<2	--	--
Tert-Butylbenzene	ug/L	4	ND	<0.5	25	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	--	--
Tetrachloroethylene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	D	<0.5	5	--
Toluene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	150	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-1 Summary of 2011 Volatile Organic Compound (VOC) Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Total Trihalomethanes	ug/L	3	ND	<0.5	16	D	<0.5	3	ND	<0.5	0	--	--	2	D	NA	80	--
Trans-1,2-Dichloroethylene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	10	--
Trichloroacetic Acid (TCAA)	ug/L	0	--	--	4	ND	<1	0	--	--	0	--	--	0	--	--	--	--
Trichloroethylene	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	5	--
Trichlorofluoromethane (Freon 11)	ug/L	4	ND	<5	98	ND	<5	3	ND	<5	0	--	--	33	ND	<5	150	--
Vinyl Chloride	ug/L	4	ND	<0.5	98	ND	<0.5	3	ND	<0.5	0	--	--	33	ND	<0.5	0.5	--
Xylenes (Total)	ug/L	4	ND	<1	86	ND	<1	3	ND	<1	0	--	--	0	--	--	1750	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-2 Summary of 2011 Detected Volatile Organic Compounds (VOCs)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain								Santa Clara Subbasin Coyote Valley				Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
1,1,1-Trichloroethane	ug/L	4	<0.5	0.79	0.91	98	<0.5	<0.5	4.1	3	<0.5	<0.5	<0.5	0	--	--	--	33	<0.5	<0.5	<0.5	200	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	ug/L	4	<2	<10	<10	98	<2	1.47	13	3	<10	<10	<10	0	--	--	--	33	<10	<10	<10	1,200	--
1,1-Dichloroethylene	ug/L	4	<0.5	<0.5	<0.5	98	<0.5	<0.5	5.3	3	<0.5	<0.5	<0.5	0	--	--	--	33	<0.5	<0.5	<0.5	6	--
Bromodichloromethane (THM)	ug/L	4	<0.5	<1	<1	3	<0.5	0.5	0.53	3	<1	<1	<1	0	--	--	--	33	<1	<1	2.2	--	--
Bromoform (THM)	ug/L	4	<0.5	<1	<1	26	<0.5	<0.5	0.55	3	<1	<1	<1	0	--	--	--	33	<1	<1	3.2	--	--
Chloroform (THM)	ug/L	4	<0.5	<1	<1	26	<0.5	0.37	2	3	<1	<1	<1	0	--	--	--	33	<1	<1	1	--	--
Di(2-Ethylhexyl)Phthalate	ug/L	1	0.501	0.501	0.501	1	0.611	0.611	0.611	5	<3	<3	<3	0	--	--	--	18	<3	<3	<3	4	--
Dibromochloromethane (THM)	ug/L	4	<0.5	<1	<1	26	<0.5	<1	<1	3	<1	<1	<1	0	--	--	--	33	<1	<1	3.3	--	--
Di-N-Butylphthalate	ug/L	1	2.49	2.49	2.49	1	2.58	2.58	2.58	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Tetrachloroethylene	ug/L	4	<0.5	<0.5	<0.5	98	<0.5	<0.5	<0.5	3	<0.5	<0.5	<0.5	0	--	--	--	33	<0.5	<0.5	1.7	5	--
Total Trihalomethanes	ug/L	3	<0.5	<0.5	<0.5	16	<0.5	<0.5	2.5	3	<0.5	<0.5	<0.5	0	--	--	--	2	2	5.85	9.7	80	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound ofthe estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-3 Number of Wells with Detections of VOCs in 2011

Parameter	Number of Wells with Detection	Number of Wells Analyzed	Maximum Concentration Detected (ug/L)[1]	MCL[2] (ug/L)
1,1,1-Trichloroethane	9	102	4.1	200
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1	102	13	1,200
1,1-Dichloroethylene	3	102	5.3	6
Bromodichloromethane (THM)	3	43	2.2	--[3]
Bromoform (THM)	3	43	3.2	--[3]
Chloroform (THM)	3	43	2	--[3]
Di (2-Ethylhexyl) Phthalate	2	48	0.6	4
Dibromochloromethane (THM)	1	43	3.3	--[3]
Di-N-Butylphthalate	2	2	2.6	--
Tetrachloroethylene	3	102	1.7	5
Total Trihalomethanes	4	18	9.7	80

Notes:
1. ug/L = micrograms per liter
2. MCL = Maximum Contaminant Level, or health-based standard, set by the California Department of Public Health (CDPH).
3. No individual MCLs established, however total trihalomethanes are not to exceed 80 ug/L.

Table 4-4 Summary of 2011 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
2,3,7,8-TCDD (Dioxin)	ug/L	0	NA	--	13	ND	<0.000005	5	ND	<0.000005	0	NA	--	0	NA	--	0.00003	--
2,4-D	ug/L	13	ND	<10	44	ND	<10	13	ND	<10	21	ND	<10	36	ND	<10	70	--
2-4-5-TP (Silvex)	ug/L	14	ND	<1	45	ND	<1	13	ND	<1	21	ND	<1	36	ND	<1	50	--
3-Hydroxycarbofuran	ug/L	14	ND	<3	20	ND	<3	13	ND	<3	21	ND	<3	35	ND	<3	--	--
4,4-DDD	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
4,4-DDE	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
4,4-DDT	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Acetochlor	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Aciflurfen	ug/L	14	ND	<0.5	9	ND	<0.5	8	ND	<0.5	21	ND	<0.5	17	ND	<0.5	--	--
Alachlor	ug/L	15	ND	<1	29	ND	<1	13	ND	<1	21	ND	<1	36	ND	<1	2	--
Aldicarb	ug/L	14	ND	<3	20	ND	<3	13	ND	<3	21	ND	<3	35	ND	<3	--	--
Aldicarb Sulfone	ug/L	14	ND	<4	20	ND	<4	13	ND	<4	21	ND	<4	35	ND	<4	--	--
Aldicarb Sulfoxide	ug/L	14	ND	<3	20	ND	<3	13	ND	<3	21	ND	<3	35	ND	<3	--	--
Aldrin	ug/L	15	ND	<0.25	21	ND	<0.25	13	ND	<0.075	21	ND	<0.075	35	ND	<0.075	--	--
Alpha-BHC	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Atrazine	ug/L	1	ND	<0.25	20	ND	<0.5	5	ND	<0.5	0	NA	--	19	ND	<0.5	1	--
Bentazon	ug/L	14	ND	<2	45	ND	<2	13	ND	<2	21	ND	<2	36	ND	<2	18	--
Beta-BHC	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Bromacil	ug/L	1	ND	<1	12	ND	<10	4	ND	<10	0	NA	--	18	ND	<10	--	--
Butachlor	ug/L	1	ND	<0.25	12	ND	<0.38	4	ND	<0.38	0	NA	--	18	ND	<0.38	--	--
Carbaryl	ug/L	14	ND	<5	22	ND	<5	13	ND	<5	21	ND	<5	35	ND	<5	--	--
Carbofuran	ug/L	14	ND	<5	29	ND	<5	13	ND	<5	21	ND	<5	35	ND	<5	18	--
Chlordane	ug/L	14	ND	<0.1	27	ND	<0.1	13	ND	<0.1	21	ND	<0.1	35	ND	<0.1	0.1	--
Chlordane-Gamma	ug/L	2	ND	<0.25	2	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Chlorobenzilate	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-4 Summary of 2011 Pesticide Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Chloroneb	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Chlorothalonil	ug/L	1	ND	<0.25	4	ND	<5	0	NA	--	0	NA	--	18	ND	<5	--	--
Chlorpyrifos	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Cis-1,3-Dichloropropene	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	NA	--	33	ND	<0.5	0.5	--
Cis-Permethrin	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Dalapon	ug/L	14	ND	<10	45	ND	<10	13	ND	<10	21	ND	<10	36	ND	<10	200	--
DCPA (Total Di & Mono Acid Degradates)	ug/L	0	NA	--	8	ND	<0.1	5	ND	<0.1	0	NA	--	0	NA	--	--	--
DCPA Methyl Ester (Dacthal)	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
DDVP	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Delta-BHC	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Diazinon	ug/L	0	NA	--	8	ND	<0.1	4	ND	<0.1	0	NA	--	0	NA	--	--	--
Dicamba	ug/L	14	ND	<1.5	20	ND	<1.5	13	ND	<1.5	21	ND	<1.5	36	ND	<1.5	--	--
Dieldrin	ug/L	15	ND	<0.25	21	ND	<0.25	13	ND	<0.02	21	ND	<0.02	35	ND	<0.02	--	--
Dimethoate	ug/L	0	NA	--	8	ND	<0.1	4	ND	<0.1	0	NA	--	0	NA	--	--	--
Dinoseb	ug/L	14	ND	<2	45	ND	<2	13	ND	<2	21	ND	<2	36	ND	<2	7	--
Diquat	ug/L	0	NA	--	18	ND	<4	5	ND	<4	0	NA	--	1	ND	<4	20	--
Endosulfan I	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Endosulfan II	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Endosulfan Sulfate	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Endothall	ug/L	0	NA	--	18	ND	<45	5	ND	<45	0	NA	--	18	ND	<45	100	--
Endrin	ug/L	15	ND	<0.25	28	ND	<0.25	13	ND	<0.1	21	ND	<0.1	35	ND	<0.1	2	--
Endrin Aldehyde	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Endrin Ketone	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
EPTC (EPTAM)	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Ethyl Parathion	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-4 Summary of 2011 Pesticide Data (continued)

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain						Santa Clara Subbasin Coyote Valley			Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Gamma-BHC (Lindane)- Total	ug/L	15	ND	<0.2	28	ND	<0.2	13	ND	<0.2	21	ND	<0.2	35	ND	<0.2	0.2	--
Glyphosate	ug/L	14	ND	<25	29	ND	<25	15	ND	<25	21	ND	<25	17	ND	<25	700	--
Heptachlor	ug/L	15	ND	<0.25	28	ND	<0.25	13	ND	<0.01	21	ND	<0.01	35	ND	<0.01	0.01	--
Heptachlor Epoxide	ug/L	14	ND	<0.01	27	ND	<0.01	13	ND	<0.01	21	ND	<0.01	35	ND	<0.01	0.01	--
Heptachlor Epoxide (Isomer A)	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Heptachlor Epoxide (Isomer B)	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Hexachlorobenzene	ug/L	15	ND	<0.5	28	ND	<0.5	13	ND	<0.5	21	ND	<0.5	35	ND	<0.5	1	--
Hexachlorocyclopentadiene	ug/L	15	ND	<1	28	ND	<1	13	ND	<1	21	ND	<1	35	ND	<1	50	--
Malathion	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Methiocarb	ug/L	14	ND	<2	17	ND	<2	13	ND	<2	21	ND	<2	17	ND	<2	--	--
Methomyl	ug/L	14	ND	<2	22	ND	<2	13	ND	<2	21	ND	<2	35	ND	<2	--	--
Methoxychlor	ug/L	15	ND	<10	28	ND	<10	14	ND	<10	21	ND	<10	35	ND	<10	30	--
Metolachlor	ug/L	1	ND	<0.25	9	ND	<0.25	4	ND	<0.05	0	NA	--	0	NA	--	--	--
Metribuzin	ug/L	1	ND	<0.25	9	ND	<0.25	4	ND	<0.05	0	NA	--	0	NA	--	--	--
Molinate	ug/L	1	ND	<0.5	20	ND	<2	5	ND	<2	0	NA	--	18	ND	<2	20	--
Oxamyl	ug/L	14	ND	<20	29	ND	<20	13	ND	<20	21	ND	<20	35	ND	<20	50	--
Pentachlorophenol	ug/L	15	ND	<1	46	ND	<1	13	ND	<0.2	21	ND	<0.2	36	ND	<0.2	1	--
Picloram	ug/L	13	ND	<1	44	ND	<1	13	ND	<1	21	ND	<1	36	ND	<1	500	--
Prometryn	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Propachlor	ug/L	1	ND	<0.5	12	ND	<0.5	4	ND	<0.5	0	NA	--	18	ND	<0.5	--	--
Propoxur	ug/L	14	ND	<2	17	ND	<2	13	ND	<2	21	ND	<2	17	ND	<2	--	--
Simazine	ug/L	1	ND	<0.25	20	ND	<1	5	ND	<1	0	NA	--	19	ND	<1	4	--
Terbacil	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Thiobencarb	ug/L	1	ND	<0.25	20	ND	<1	5	ND	<1	0	NA	--	18	ND	<1	70	1
Toxaphene	ug/L	14	ND	<1	27	ND	<1	13	ND	<1	21	ND	<1	35	ND	<1	3	--
Trans-1,3-Dichloropropene	ug/L	4	ND	<0.5	13	ND	<0.5	3	ND	<0.5	0	NA	--	33	ND	<0.5	--	--
Trans-Nonachlor	ug/L	1	ND	<0.25	1	ND	<0.25	0	NA	--	0	NA	--	0	NA	--	--	--
Trans-Permethrin	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--
Trifluralin	ug/L	1	ND	<0.5	1	ND	<0.5	0	NA	--	0	NA	--	0	NA	--	--	--

Notes:
1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.

Table 4-5 Summary of 2011 Radioactive Parameter Data

Parameter	Units[1]	Santa Clara Subbasin - Santa Clara Plain								Santa Clara Subbasin – Coyote Valley				Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Gross Alpha	pCi/L	0	--	--	--	20	1.14	2.35	6.33	5	0.15	0.15	0.15	0	--	--	--	8	0.02	0.8	2	15	--
Gross Alpha Counting Error	pCi/L	0	--	--	--	20	0.2	0.91	2.7	5	0.11	0.15	0.57	0	--	--	--	8	0.11	0.28	1.75	--	--
Gross Alpha MDA95	pCi/L	0	--	--	--	19	0.02	0.26	3	0	--	--	--	0	--	--	--	1	2.04	2.04	2.04	--	--
Gross Beta	mrem/yr	0	--	--	--	4	<4	<4	<4	0	--	--	--	0	--	--	--	0	--	--	--	4	--
Gross Beta Counting Error	pCi/L	0	--	--	--	4	0.774	1	1.3	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Gross Beta MDA95	pCi/L	0	--	--	--	3	3	3	3	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Radium 228	pCi/L	0	--	--	--	1	1.96	1.96	1.96	0	--	--	--	0	--	--	--	0	--	--	--	5[9]	--
Radium 228 Counting Error	pCi/L	0	--	--	--	1	0.43	0.43	0.43	0	--	--	--	0	--	--	--	0	--	--	--	--	--
Radium 288 MDA95	pCi/L	0	--	--	--	1	0.39	0.39	0.39	0	--	--	--	0	--	--	--	0	--	--	--	--	--

Notes:
1. pCi/l = picocuries per liter; mrem/yr = millirem per year.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per CDPH or US EPA.
9. The MCL is 5 pCi/L for radium-226 and radium-228 combined.

Figure 4-1 Wells with Detections of Volatile Organic Compounds (VOCs) in 2011, Santa Clara Subbasin

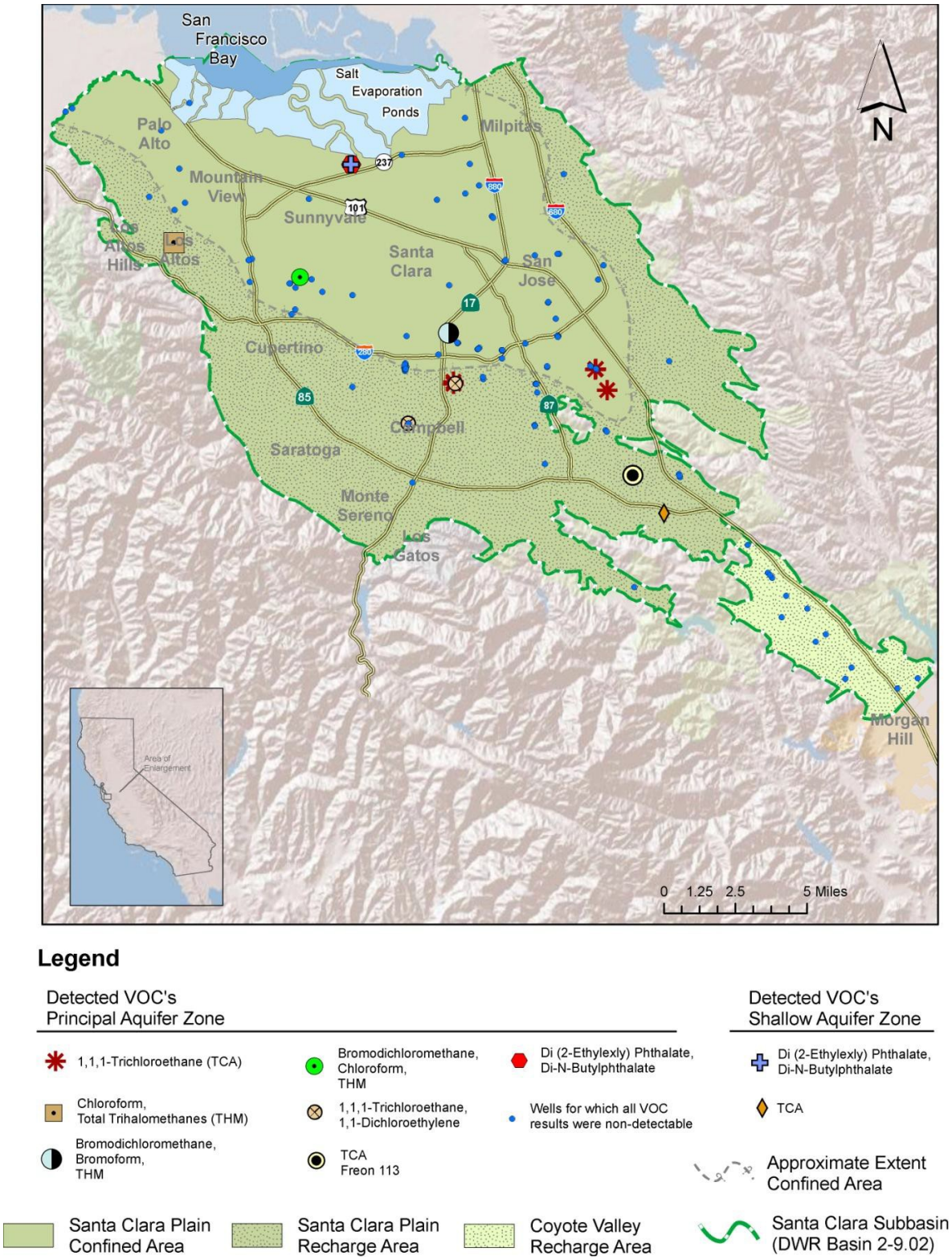
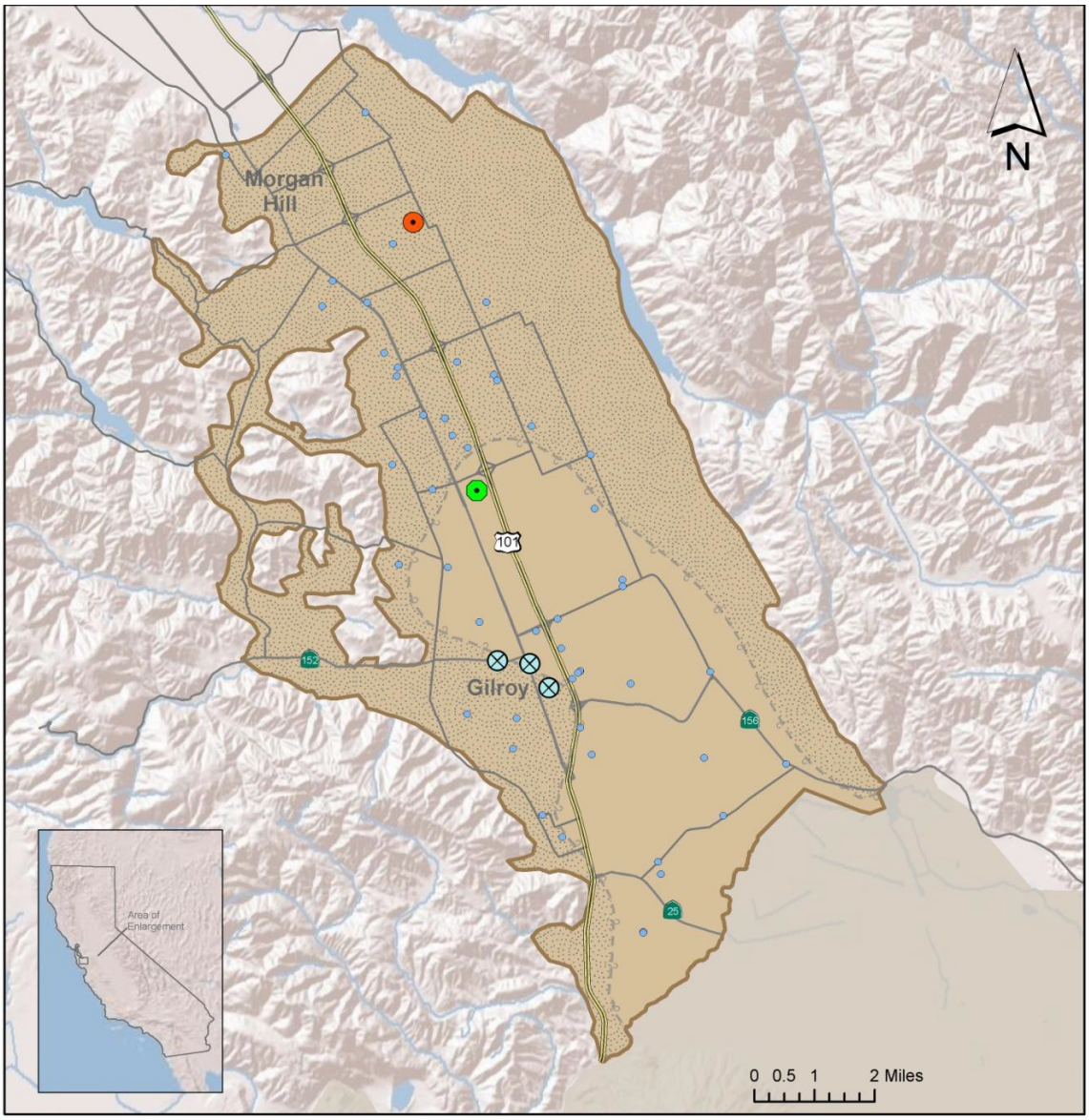


Figure 4–2 Wells with Detections of Volatile Organic Compounds (VOCs) in 2011, Llagas Subbasin



Legend

Detected VOCs
Principal Aquifer Zone

- Tetrachloroethylene
- Bromoform, Total Trihalomethanes (THM)
- Bromodichloromethane, Bromoform, Chloroform, Dibromochloromethane, THM
- Wells for which all VOC results were non-detectable

- Llagas Confined Area
- Llagas Recharge Area
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent Confined Area

Note; No VOCs were detected in the Shallow Aqufer Zone of Llagas subbasin

5 2011 GROUNDWATER QUALITY REPORT
Summary and Conclusions

As part of the District's groundwater quality monitoring program, analytical results from samples collected by the District and water suppliers in calendar year 2011 were evaluated in relation to drinking water standards and agricultural objectives. In addition, temporal trends in water quality were analyzed for nitrate, TDS, and chloride. Water quality indicators, major and minor ions, trace elements, volatile and non-volatile organic compounds (pesticides) were analyzed in as many as 308 wells comprised of mostly municipal or domestic supply wells with a smaller number of dedicated monitoring wells. The majority of wells within Santa Clara County produce high-quality water that meets drinking water standards, and the continued evaluation of regional quality and potential threats helps to ensure high-quality groundwater will continue to be available.

2011 monitoring results indicate that groundwater quality in Santa Clara County is generally very high, with nearly all water supply wells meeting primary drinking water standards. In North County (the Santa Clara Plain), 95% of water supply wells tested met the Maximum Contaminant Level (MCL) for aluminum, with three wells above the MCL. For all other parameters, 100% of water supply wells tested in the Santa Clara Plain met MCLs in 2011. In South County (the Coyote Valley and Llagas Subbasin), 97% of water supply wells tested met the MCLs for aluminum and perchlorate, with the exceptions noted in Table 5-1. The nitrate MCL was met in 91% of South County water supply wells tested; nitrate remains the most notable exception to high groundwater quality in Santa Clara County. Bacteria was also present in 5 domestic cooperative wells in South County. All other parameters were below MCLs in South County water supply wells tested in 2011.

For all wells tested in 2011 (including monitoring and water supply wells), primary drinking water standards were exceeded at the following percentage of wells tested: nitrate (7%); aluminum (3%), perchlorate (1%); and arsenic (less than 1%). Bacteria was also present in 5 South County wells. Table 5-1 summarizes the parameters detected above primary drinking water standards (MCLs) in 2011. It should be noted that many of these detections occurred at monitoring wells, which are not used for water supply.

For the wells analyzed in this report, secondary standards were exceeded at the following percentage of wells tested countywide: TDS (23%), manganese (15%), specific conductance (15%), iron (10%), pH (6%) turbidity (5%), and aluminum (5%). It should be noted that the drinking water standards for some constituents, such as TDS, are given as a range by CDPH. For these constituents, the lowest value (recommended limit) was used in this analysis.

Groundwater quality was also evaluated against established agricultural objectives from the appropriate Water Board Basin Plans. The most common exceedance of agricultural objectives in the Santa Clara Subbasin was for nitrate; the objective was exceeded in 7% of the shallow zone wells and 23% of the principal zone wells. The other constituents detected above agricultural objectives included boron, chloride, manganese, molybdenum, specific conductance, nitrate + nitrite, and adjusted SAR. In the Llagas Subbasin, the Central Coast Water Board's lowest specific conductance objective was exceeded at 24% of wells tested. However, no wells were found to have specific conductance greater than the upper limit at which point severe problems would be expected to occur. The other constituents detected above agricultural objectives in the Llagas Subbasin were bicarbonate, chloride, manganese, nitrate, and nitrate + nitrite, and adjusted SAR.

Countywide trend analyses for TDS, chloride, and nitrate were conducted for 200, 203, and 418 wells, respectively using ten years of data (2002-2011). The majority of wells analyzed for trend did not indicate any statistically significant trend. For the wells analyzed countywide for trend, there were upward trends for the following

percentage of wells: nitrate (5%), TDS (3.5%), and chloride (4%). For the wells analyzed countywide for trend, there were downward trends for the following percentage of wells: nitrate (12%), chloride (2%), and TDS (2%). The remaining wells (majority of wells) did not indicate statistical evidence of trend. Trends varied by subbasin and zone as shown in Table 5-2.

In the Santa Clara Plain and Coyote Valley, the location of wells with detectable nitrate and chloride trends did not appear to be entirely random with some areas marked by wells having generally consistent trend results. In the Llagas Subbasin, no easily discernable pattern of nitrate trend results was evident while trends of TDS and chloride were too few in number to attempt to discern any pattern. District staff will continue to perform trend analysis for select constituents that may provide early warning of potential groundwater degradation. As discussed in Chapter 3, the District will re-evaluate alternative approaches to analyzing trends in future annual groundwater quality reports.

Analysis of 2011 groundwater quality data from monitoring performed by the District and water suppliers indicates that groundwater in Santa Clara County generally meets drinking water standards without the need for treatment. However, some results above drinking water standards are noted, including elevated nitrate in portions of Coyote Valley and the Llagas Subbasin and a small number of exceedances for perchlorate, arsenic, and aluminum. With regard to secondary, aesthetic standards, elevated levels of total dissolved solids, specific conductance, manganese and iron were detected at various wells throughout the county. These elevated concentrations present some challenges to water suppliers or well owners, who may need to blend or treat the water prior to delivery or use.

The District will continue to collect and analyze groundwater quality data to characterize regional groundwater quality, determine the severity and extent of contamination, evaluate changes in water quality over time, and identify potential threats to help ensure the groundwater basins are protected from contamination and the threat of contamination. Understanding the quality of groundwater and potential degradation or adverse trends allows the District to better understand individual threats and pursue appropriate action to protect groundwater quality. These actions may include:

- Performing additional analysis to determine possible causes and remedies to address potentially adverse conditions or trends.
- Conducting public outreach to raise awareness of groundwater protection.
- Coordinating with regulatory agencies to pursue the timely restoration of degraded groundwater.
- Developing strategies to address ongoing loading of salts and nutrients, like nitrate.
- Working with local cities and the county to ensure land use activities do not adversely impact groundwater resources.
- Efforts to influence statewide legislation and policy to ensure groundwater resources are aggressively protected.

Table 5-1 Wells with Constituents Exceeding Primary Drinking Water Standards in 2011

Subbasin	Area and Zone	Parameter	Notes
Santa Clara Subbasin	Santa Clara Plain Shallow Zone	Arsenic	Arsenic was detected above the MCL at one shallow monitoring located near the southern shore of San Francisco Bay. This well is not used for domestic or irrigation supply.
	Santa Clara Plain Principal Zone	Aluminum	Aluminum was detected above the MCL at three public water supply wells. Subsequent testing at one well did not find concentrations above the MCL.
	Coyote Valley	Nitrate	Nitrate was detected above the MCL at 2 water supply wells and one private domestic supply well.
Llagas Subbasin	Shallow Zone	Bacteria Nitrate	Total coliform bacteria were present in two domestic wells and E. coli was present in one of those wells. Nitrate was detected above the MCL at 9 monitoring wells and 2 private domestic supply wells.
	Principal Zone	Aluminum Bacteria Nitrate Perchlorate	Aluminum was detected above the MCL at one monitoring well. Total coliform bacteria were present in 3 domestic wells. Nitrate was detected above the MCL at 5 water supply wells (3 domestic and 2 public). Perchlorate was detected above the MCL at 2 public water supply wells.

Note:
Wells sampled by the District include monitoring wells and private domestic wells, which are not subject to regulation by CDPH. While this report includes the analysis of data collected by public water suppliers, the identification of any parameter above drinking water standards in this report does not necessarily indicate the delivery of unsafe water to consumers. CDPH does not consider a single detection of a contaminant to be indicative of contamination and does not consider a single detection to be an actual finding without a follow-up detection. Public water suppliers are required to meet drinking water standards, which may require blending or treatment prior to delivery.

Table 5-2 Summary of Trend Analyses (2002-2011)

Constituent	Number of Wells Analyzed[1]	Wells with Increasing Trends (%)	Wells with Decreasing Trends (%)	Wells with no Apparent Trend (%)
Santa Clara Subbasin Santa Clara Plain - Shallow Aquifer Zone[2]				
Total Dissolved Solids	20	10%	15%	75%
Chloride	28	11%	7%	82%
Nitrate	18	0%	0%	100%
Santa Clara Subbasin Santa Clara Plain - Principal Aquifer Zone[3]				
Total Dissolved Solids	108	1%	1%	98%
Chloride	107	0%	2%	98.2%
Nitrate	235	5%	9%	86%
Santa Clara Subbasin Coyote Valley				
Total Dissolved Solids	17	12%	0%	88%
Chloride	15	0%	0%	100%
Nitrate	30	7%	20%	73%
Llagas Subbasin Shallow Aquifer Zone				
Total Dissolved Solids	22	9%	0%	91%
Chloride	20	25%	0%	75%
Nitrate	26	11%	8%	81%
Llagas Subbasin Principal Aquifer Zone				
Total Dissolved Solids	33	0%	0%	100%
Chloride	33	0%	0%	100%
Nitrate	103	5%	20%	75%

Note:

1. The number of wells tested for trend for each constituent and each zone varies, and was based on the availability of results for each constituent. A minimum of four results between 2002 and 2011 was required for the well to be included in the trend testing for a given constituent.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

APPENDIX A – LIST OF PARAMETERS ANALYZED BY DISTRICT

Parameter	Analytical Method	Parameter Code	Unit
1,1,1,2-Tetrachlorethane	EPA 524.2	77562	ug/L
1,1,1-Trichloroethane	EPA 524.2	34506	ug/L
1,1,2,2-Tetrachloroethane	EPA 524.2	34516	ug/L
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	EPA 524.2	81611	ug/L
1,1,2-Trichloroethane	EPA 524.2	34511	ug/L
1,1-Dichloroethane	EPA 524.2	34496	ug/L
1,1-Dichloroethylene	EPA 524.2	34501	ug/L
1,1-Dichloropropene	EPA 524.2	77168	ug/L
1,2,3-Trichlorobenzene	EPA 524.2	77613	ug/L
1,2,3-Trichloropropane	EPA 524.2	77443	ug/L
1,2,4-Trichlorobenzene	EPA 524.2	34551	ug/L
1,2,4-Trimethylbenzene	EPA 524.2	77222	ug/L
1,2-Dichlorobenzene	EPA 524.2	34536	ug/L
1,2-Dichloroethane	EPA 524.2	34531	ug/L
1,2-Dichloropropane	EPA 524.2	34541	ug/L
1,3,5-Trimethylbenzene	EPA 524.2	77226	ug/L
1,3-Dichlorobenzene	EPA 524.2	34566	ug/L
1,3-Dichloropropane	EPA 524.2	77173	ug/L
1,3-Dichloropropene (Total)	EPA 524.2	34561	ug/L
1,4-Dichlorobenzene	EPA 524.2	34571	ug/L
1-Phenylpropane (N-Propylbenzene)	EPA 524.2	77224	ug/L
2,2-Dichloropropane	EPA 524.2	77170	ug/L
2,4,5-Tp (Silvex)	EPA 515.3	39045	ug/L
2,4-D	EPA 515.3	39730	ug/L
2-Chlorotoluene	EPA 524.2	A-008	ug/L
3-Hydroxycarbofuran	EPA 531.1	A-021	ug/L
4,4-DDD	EPA 525.2	39310	ug/L
4,4-DDE	EPA 525.2	39320	ug/L
4,4-DDT	EPA 525.2	39300	ug/L
4-Chlorotoluene	EPA 524.2	A-009	ug/L
Acenaphthene	EPA 525.2	34205	ug/L
Acenaphthylene	EPA 525.2	34200	ug/L
Acetochlor	EPA 525.2	04240	ug/L
Aciflurfen	EPA 515.3	79193	ug/L
Alachlor	EPA 505	77825	ug/L
Aldicarb	EPA 531.1	39053	ug/L
Aldicarb Sulfone	EPA 531.1	A-020	ug/L
Aldicarb Sulfoxide	EPA 531.1	A-019	ug/L
Aldrin	EPA 505	39330	ug/L
Alkalinity (Total) As CaCO3	SM 2320 B	00410	mg/L
Alkalinity- Bicarbonate (As CaCO3)	SM 2320 B	00425	mg/L
Alkalinity- Carbonate (As CaCO3)	SM 2320 B	00430	mg/L
Alkalinity- Hydroxide (As CaCO3)	SM 2320 B	00420	mg/L
Alpha-BHC	EPA 525.2	39337	ug/L
Aluminum	EPA 200.7	01105	ug/L

Parameter	Analytical Method	Parameter Code	Unit
Anthracene	EPA 525.2	34220	ug/L
Antimony	EPA 200.8	01097	ug/L
Arsenic	EPA 200.8	01002	ug/L
Atrazine	EPA 525.2	39033	ug/L
Barium	EPA 200.8	01007	ug/L
Bentazon	EPA 515.3	38710	ug/L
Benzene	EPA 524.2	34030	ug/L
Benzo (A) Anthracene	EPA 525.2	34526	ug/L
Benzo (A) Pyrene	EPA 525.2	34247	ug/L
Benzo (B) Fluoranthene	EPA 525.2	34230	ug/L
Benzo (Ghi) Perylene	EPA 525.2	34521	ug/L
Benzo (K) Fluoranthene	EPA 525.2	34242	ug/L
Benzyl Butyl Phthalate	EPA 525.2	34292	ug/L
Beryllium	EPA 200.8	01012	ug/L
Beta-BHC	EPA 525.2	39338	ug/L
Bicarbonate (As HCO3)	SM 2320 B	00440	mg/L
Boron	EPA 200.7	01020	ug/L
Bromacil	EPA 525.2	82198	ug/L
Bromate	EPA 300.1	A-027	ug/L
Bromide	EPA 300.0	82298	mg/L
Bromobenzene	EPA 524.2	81555	ug/L
Bromochloromethane	EPA 524.2	A-012	ug/L
Bromodichloromethane (THM)	EPA 524.2	32101	ug/L
Bromoform (THM)	EPA 524.2	32104	ug/L
Bromomethane	EPA 524.2	34413	ug/L
Butachlor	EPA 525.2	77860	ug/L
Cadmium	EPA 200.8	01027	ug/L
Calcium	EPA 200.7	00916	mg/L
Calcium(As CaCO3)	EPA 200.7	00910	mg/L
Carbaryl	EPA 531.1	77700	ug/L
Carbofuran	EPA 531.1	81405	ug/L
Carbon Tetrachloride	EPA 524.2	32102	ug/L
Carbonate Alkalinity	SM 2320 B	00445	mg/L
Chlorate	EPA 300.1	A-037	ug/L
Chlordane	EPA 505	39350	ug/L
Chlordane-Gamma	EPA 525.2	5103-7	ug/L
Chloride	SM 4500-Cl D	00940	mg/L
Chlorobenzilate	EPA 525.2	39460	ug/L
Chloroethane	EPA 524.2	34311	ug/L
Chloroform (THM)	EPA 524.2	32106	ug/L
Chloromethane	EPA 524.2	34418	ug/L
Chloroneb	EPA 525.2	38423	ug/L
Chlorothalonil	EPA 525.2	70314	ug/L
Chlorpyrifos	EPA 525.2	77969	ug/L
Chromium- (Total)	EPA 200.8	01034	ug/L
Chrysene	EPA 525.2	34320	ug/L
Cis-1,2-Dichloroethylene	EPA 524.2	77093	ug/L
Cis-1,3-Dichloropropene	EPA 524.2	34704	ug/L
Cis-Permethrin	EPA 525.2	82418	ug/L

Parameter	Analytical Method	Parameter Code	Unit
Cobalt	EPA 200.8	01035	ug/L
Copper	EPA 200.8	01042	ug/L
Dalapon	EPA 515.3	38432	ug/L
Dcpa Methyl Ester (Dacthal)	EPA 525.2	82682	ug/L
DDVP	EPA 525.2	38775	ug/L
Delta-BHC	EPA 525.2	34259	ug/L
Di(2-Ethylhexyl)Adipate	EPA 525.2	A-026	ug/L
Di(2-Ethylhexyl)Phthalate	EPA 525.2	39100	ug/L
Dibenzo (A-H) Antracene	EPA 525.2	34556	ug/L
Dibromochloromethane (THM)	EPA 524.2	32105	ug/L
Dibromochloropropane (DBCP)	EPA 504.1	38761	ug/L
Dibromomethane	EPA 524.2	77596	ug/L
Dicamba	EPA 515.3	82052	ug/L
Dichlorodifluoromethane (Freon 12)	EPA 524.2	34668	ug/L
Dichloromethane	EPA 524.2	34423	ug/L
Dieldrin	EPA 505	39380	ug/L
Diethyl Phthalate	EPA 525.2	34336	ug/L
Diisopropyl Ether	EPA 524.2	A-036	ug/L
Dimethyl Phthalate	EPA 525.2	34341	ug/L
Di-N-Butylphthalate	EPA 525.2	39110	ug/L
Di-N-Octylphthalate	EPA 525.2	34596	ug/L
Dinoseb	EPA 515.3	81287	ug/L
E Coli, Colilert P/A Method	SM 9223 B	99596	P/A 100ml
Endosulfan I	EPA 525.2	34361	ug/L
Endosulfan II	EPA 525.2	34356	ug/L
Endosulfan Sulfate	EPA 525.2	34351	ug/L
Endrin	EPA 505	39390	ug/L
Endrin Aldehyde	EPA 525.2	34366	ug/L
Endrin Ketone	EPA 525.2	53494-	ug/L
EPTC (EPTAM)	EPA 525.2	82668	ug/L
Ethyl Parathion	EPA 525.2	46315	ug/L
Ethylbenzene	EPA 524.2	34371	ug/L
Ethylene Dibromide (EDB)	EPA 504.1	77651	ug/L
Ethyl-Tert-Butyl Ether	EPA 524.2	A-033	ug/L
Fluoranthene	EPA 525.2	34376	ug/L
Fluorene	EPA 525.2	34381	ug/L
Fluoride (Natural Source)	EPA 300.0	00951	mg/L
Gamma-Bhc (Lindane)- Total	EPA 505	39340	ug/L
Glyphosate	EPA 547	79743	ug/L
Hardness (Total) As CaCO3	SM 2340 C	00900	mg/L
Heptachlor	EPA 505	39410	ug/L
Heptachlor Epoxide	EPA 505	39420	ug/L
Heptachlor Epoxide (Isomer A)	EPA 525.2	28044-	ug/L
Heptachlor Epoxide (Isomer B)	EPA 525.2	1024-5	ug/L
Hexachlorobenzene	EPA 505	39700	ug/L
Hexachlorobutadiene	EPA 524.2	34391	ug/L
Hexachlorocyclopentadiene	EPA 505	34386	ug/L
Hydroxide Alkalinity	SM 2320 B	71830	mg/L
Iron	EPA 200.7	01045	ug/L

Parameter	Analytical Method	Parameter Code	Unit
Isophorone	EPA 525.2	34408	ug/L
Isopropylbenzene	EPA 524.2	77223	ug/L
Lead	EPA 200.8	01051	ug/L
Lithium	EPA 200.7	01132	ug/L
Magnesium	EPA 200.7	00927	mg/L
Malathion	EPA 525.2	39530	ug/L
Manganese	EPA 200.8	01055	ug/L
Methiocarb	EPA 531.1	38500	ug/L
Methomyl	EPA 531.1	39051	ug/L
Methoxychlor	EPA 505	39480	ug/L
Methyl-Tert-Butyl-Ether (MTBE)	EPA 524.2	46491	ug/L
Metolachlor	EPA 525.2	39356	ug/L
Metribuzin	EPA 525.2	81408	ug/L
Molinate	EPA 525.2	82199	ug/L
Molybdenum	EPA 200.8	01062	ug/L
Monochlorobenzene	EPA 524.2	34301	ug/L
M-P-Xylene	EPA 524.2	A-014	ug/L
Naphthalene	EPA 524.2	34696	ug/L
N-Butylbenzene	EPA 524.2	A-010	ug/L
Nickel	EPA 200.8	01067	ug/L
Nitrate (As NO3)	EPA 300.0	71850	mg/L
Oxamyl	EPA 531.1	38865	ug/L
O-Xylene	EPA 524.2	77135	ug/L
Pentachlorophenol	EPA 515.3	39032	ug/L
Perchlorate	EPA 314.0	A-031	ug/L
pH	Lab/Field	00403	PH UNITS
Phenanthrene	EPA 525.2	34461	ug/L
Phosphate- Ortho	EPA 300.0	00660	mg/L
Picloram	EPA 515.3	39720	ug/L
P-Isopropyltoluene	EPA 524.2	A-011	ug/L
Polychlorinated Biphenyls (Total PCBs)	EPA 505	39516	ug/L
Potassium	EPA 200.7	00937	mg/L
Prometryn	EPA 525.2	39057	ug/L
Propachlor	EPA 525.2	38533	ug/L
Propoxur	EPA 531.1	38537	ug/L
Pyrene	EPA 525.2	34469	ug/L
Sec-Butylbenzene	EPA 524.2	77350	ug/L
Selenium	EPA 200.8	01147	ug/L
Silica	EPA 200.7	00955	mg/L
Silver	EPA 200.8	01077	ug/L
Simazine	EPA 525.2	39055	ug/L
Sodium	EPA 200.7	00929	mg/L
Source Temperature C	Field	00010	C
Specific Conductance	Lab/Field	00095	uS/CM
Styrene	EPA 524.2	77128	ug/L
Sulfate	EPA 300.0	00945	mg/L
Terbacil	EPA 525.2	38882	ug/L
Tert-Amyl-Methyl Ether	EPA 524.2	A-034	ug/L
Tert-Butyl Alcohol	EPA 524.2	77035	ug/L

Parameter	Analytical Method	Parameter Code	Unit
Tert-Butylbenzene	EPA 524.2	77353	ug/L
Tetrachloroethylene	EPA 524.2	34475	ug/L
Thallium	EPA 200.8	01059	ug/L
Thiobencarb	EPA 525.2	A-001	ug/L
Toluene	EPA 524.2	34010	ug/L
Total Coliform, Colilert P/A Method	SM 9223 B	99595	P/A 100ml
Total Filterable Residue @ 180 C (TDS)	SM 2540 C	70300	mg/L
Toxaphene	EPA 505	39400	ug/L
Trans-1,2-Dichloroethylene	EPA 524.2	34546	ug/L
Trans-1,3-Dichloropropene	EPA 524.2	34699	ug/L
Trans-Nonachlor	EPA 525.2	79768	ug/L
Trans-Permethrin	EPA 525.2	82420	ug/L
Trichloroethylene	EPA 524.2	39180	ug/L
Trichlorofluoromethane (Freon 11)	EPA 524.2	34488	ug/L
Trifluralin	EPA 525.2	81284	ug/L
Turbidity	Lab/Field	82079	NTU
Vanadium	EPA 200.8	01087	ug/L
Vinyl Chloride	EPA 524.2	39175	ug/L
Xylenes (Total)	EPA 524.2	81551	ug/L
Zinc	EPA 200.7	01092	ug/L

APPENDIX B - MANN-KENDALL RESULTS FOR WELLS WITH STATISTICALLY SIGNIFICANT DOWNWARD CONCENTRATION TREND, 2002 - 2011

Masked Well ID	Parameter	n	S	z	p value	τ	Magnitude of Trend
Santa Clara Subbasin Santa Clara Plain, Shallow Aquifer Zone							
SC-32	Chloride	8	-21	-2.47	0.008	-0.75	-1.0
SC-46	Chloride	11	-35	-2.65	0.006	-0.64	-2.0
SC-44	TDS	6	-13	-2.25	0.016	-0.87	-45.0
SC-55	TDS	9	-23	-2.31	0.018	-0.64	-12.4
SC-90	TDS	8	-17	-2.00	0.046	-0.61	2.1
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone							
SC-30	Chloride	6	-14	-2.44	0.008	-0.93	-6.9
SC-51	Chloride	8	-17	-1.98	0.046	-0.61	-1.7
SC-139	Nitrate	5	-10	-2.21	0.016	-1.00	-1.3
SC-169	Nitrate	20	-97	-3.16	0.002	-0.51	-0.7
SC-173	Nitrate	31	-174	-2.95	0.002	-0.37	-0.4
SC-174	Nitrate	12	-31	-2.06	0.038	-0.47	-0.6
SC-177	Nitrate	19	-59	-2.04	0.042	-0.35	-0.6
SC-221	Nitrate	6	-13	-2.63	0.016	-0.87	-1.3
SC-222	Nitrate	10	-25	-2.15	0.028	-0.56	-1.2
SC-26	Nitrate	6	-12	-2.07	0.036	-0.80	-0.4
SC-237	Nitrate	19	-61	-2.17	0.034	-0.36	-0.4
SC-238	Nitrate	7	-18	-2.67	0.006	-0.86	-0.6
SC-246	Nitrate	11	-42	-3.25	0.000	-0.76	-0.8
SC-30	Nitrate	10	-23	-1.97	0.046	-0.51	-0.5
SC-250	Nitrate	10	-41	-3.58	0.000	-0.91	-1.0
SC-253	Nitrate	10	-26	-2.26	0.022	-0.58	-1.0
SC-255	Nitrate	8	-24	-2.85	0.002	-0.86	-0.2
SC-42	Nitrate	16	-51	-2.25	0.022	-0.43	-0.2
SC-50	Nitrate	38	-271	-3.39	0.000	-0.39	-0.4
SC-51	Nitrate	10	-31	-2.68	0.004	-0.69	-0.2
SC-53	Nitrate	20	-86	-2.76	0.004	-0.45	-0.8
SC-70	Nitrate	36	-229	-3.11	0.002	-0.36	-1.3
SC-101	Nitrate	10	-26	-2.25	0.022	-0.58	-0.4
SC-114	Nitrate	10	-28	-2.43	0.012	-0.62	-1.0
SC-165	TDS	6	-13	-2.25	0.016	-0.87	-14.3
Santa Clara Subbasin - Coyote Valley							
C-15	Nitrate	20	-91	-2.93	0.002	-0.48	-1.2
C-19	Nitrate	11	-48	-3.67	0.000	-0.87	-0.3
C-21	Nitrate	10	-35	-3.18	0.000	-0.78	-0.9
C-25	Nitrate	5	-10	-2.21	0.016	-1.00	-1.8
C-24	Nitrate	10	-25	-2.16	0.028	-0.56	-0.5
C-4	Nitrate	9	-22	-2.19	0.024	-0.61	-0.4
Llagas Subbasin – Shallow Aquifer Zone							
L-4	Nitrate	8	-22	-2.60	0.004	-0.79	-1.4
L-81	Nitrate	10	-41	-3.58	0.000	-0.91	-0.9

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	p value	τ	Magnitude of Trend
Llagas Subbasin - Principal Aquifer Zone							
L-113	Nitrate	15	-44	-2.18	0.032	-0.42	-1.0
L-114	Nitrate	15	-84	-4.12	0.000	-0.80	-4.0
L-21	Nitrate	10	-37	-3.25	0.000	-0.82	-1.1
L-22	Nitrate	10	-31	-2.91	0.004	-0.69	-0.6
L-23	Nitrate	9	-25	-2.54	0.008	-0.69	-0.7
L-30	Nitrate	7	-18	-2.58	0.006	-0.86	-1.0
L-34	Nitrate	15	-58	-2.83	0.002	-0.55	-2.2
L-7	Nitrate	10	-33	-2.78	0.002	-0.73	-1.3
L-41	Nitrate	8	-18	-2.10	0.032	-0.64	-1.5
L-8	Nitrate	8	-24	-2.89	0.002	-0.86	-1.5
L-43	Nitrate	19	-67	-2.21	0.020	-0.39	-0.4
L-48	Nitrate	11	-31	-2.36	0.016	-0.56	-0.6
L-10	Nitrate	10	-27	-2.37	0.016	-0.60	-0.4
L-56	Nitrate	8	-22	-2.60	0.004	-0.79	-6.9
L-61	Nitrate	11	-30	-2.27	0.020	-0.55	-0.7
L-65	Nitrate	29	-188	-3.52	0.000	-0.46	-1.8
L-11	Nitrate	9	-27	-2.77	0.004	-0.75	-0.4
L-85	Nitrate	34	-243	-3.60	0.000	-0.43	-21.5
L-96	Nitrate	33	-234	-3.67	0.000	-0.44	-0.5
L-97	Nitrate	35	-168	-2.47	0.016	-0.28	-0.2
L-98	Nitrate	7	-19	-2.70	0.002	-0.90	-0.9

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

APPENDIX C - MANN-KENDALL RESULTS FOR WELLS WITH STATISTICALLY SIGNIFICANT UPWARD CONCENTRATION TREND, 2002 - 2011

Masked Well ID	Parameter	n	S	z	p value	τ	Magnitude of Trend
Santa Clara Subbasin - Santa Clara Plain, Shallow Aquifer Zone							
SC-22	Chloride	9	36	3.65	0.000	1.00	82.5
SC-28	Chloride	9	22	2.19	0.024	0.61	14.1
SC-55	Chloride	11	40	3.04	0.000	0.73	1.2
SC-22	TDS	9	34	3.44	0.000	0.94	122.6
SC-28	TDS	7	15	2.10	0.030	0.71	43.2
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone							
SC-12	Nitrate	9	23	2.29	0.018	0.64	0.7
SC-155	Nitrate	9	23	2.31	0.018	0.64	0.7
SC-213	Nitrate	21	72	2.15	0.030	0.34	0.5
SC-52	Nitrate	24	82	2.01	0.044	0.30	0.4
SC-54	Nitrate	23	85	2.22	0.026	0.34	0.4
SC-56	Nitrate	23	85	2.22	0.026	0.34	0.8
SC-63	Nitrate	10	32	2.77	0.002	0.71	0.9
SC-81	Nitrate	5	10	2.49	0.016	1.00	0.6
SC-91	Nitrate	18	60	2.24	0.024	0.39	0.8
SC-97	Nitrate	9	22	2.19	0.024	0.61	0.9
SC-104	Nitrate	26	129	2.83	0.004	0.40	0.9
SC-107	Nitrate	5	10	2.21	0.016	1.00	1.8
SC-239	TDS	6	15	2.63	0.002	1.00	9.6
Santa Clara Subbasin - Coyote Valley							
C-10	Nitrate	8	24	2.94	0.002	0.86	2.6
C-6	Nitrate	7	15	2.10	0.030	0.71	2.6
C-14	TDS	5	10	2.21	0.016	1.00	74.8
C-6	TDS	6	13	2.25	0.016	0.87	14.1
Llagas Subbasin – Shallow Aquifer Zone							
L-26	Chloride	6	14	2.44	0.008	0.93	1.5
L-28	Chloride	7	15	2.10	0.030	0.71	1.6
L-84	Chloride	9	21	2.09	0.034	0.58	1.3
L-86	Chloride	10	32	2.77	0.002	0.71	2.2
L-116	Chloride	11	33	2.49	0.010	0.60	4.2
L-28	Nitrate	11	35	2.65	0.006	0.64	6.8
L-86	Nitrate	13	44	2.62	0.006	0.56	5.1
L-105	Nitrate	12	33	2.20	0.026	0.50	1.3
L-28	TDS	7	16	2.28	0.020	0.76	13.7
L-86	TDS	10	25	2.16	0.028	0.56	16.2

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	p value	τ	Magnitude of Trend
Llagas Subbasin – Principal Aquifer Zone							
L-29	Nitrate	7	15	2.10	0.030	0.71	2.7
L-123	Nitrate	10	30	2.60	0.006	0.67	1.1
L-59	Nitrate	11	30	2.33	0.020	0.55	0.4
L-76	Nitrate	10	23	1.97	0.046	0.51	0.6
L-80	Nitrate	9	27	2.80	0.004	0.75	0.7

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

APPENDIX D - MANN-KENDALL RESULTS FOR WELLS WITH NO STATISTICALLY SIGNIFICANT CONCENTRATION TREND, 2002 - 2011

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Shallow Aquifer Zone						
SC-18	Chloride	9	-6	-0.52	0.612	-0.17
SC-21	Chloride	7	-1	0.00	1.000	-0.05
SC-24	Chloride	7	-11	-1.50	0.136	-0.52
SC-25	Chloride	9	18	1.77	0.076	0.50
SC-27	Chloride	7	7	0.90	0.382	0.33
SC-29	Chloride	7	-10	-1.35	0.186	-0.48
SC-31	Chloride	7	-11	-1.50	0.136	-0.52
SC-35	Chloride	6	-9	-1.50	0.136	-0.60
SC-36	Chloride	7	-5	-0.60	0.562	-0.24
SC-44	Chloride	8	-14	-1.61	0.108	-0.50
SC-47	Chloride	10	-10	-0.80	0.432	-0.22
SC-62	Chloride	6	6	0.94	0.370	0.40
SC-66	Chloride	9	-1	0.00	1.000	-0.03
SC-90	Chloride	8	-3	-0.25	0.812	-0.11
SC-106	Chloride	7	-2	-0.15	0.886	-0.10
SC-167	Chloride	8	5	0.49	0.634	0.18
SC-211	Chloride	6	4	0.56	0.594	0.27
SC-235	Chloride	4	6	1.70	0.084	1.00
S-270	Chloride	7	11	1.50	0.136	0.52
S-271	Chloride	7	10	1.35	0.186	0.48
SC-244	Chloride	4	6	1.70	0.084	1.00
S-272	Chloride	7	7	0.90	0.382	0.33
S-273	Chloride	7	-6	-0.75	0.472	-0.29
SC-18	Nitrate	7	0	0.00	1.000	0.00
SC-22	Nitrate	9	0	0.00	1.000	0.00
SC-25	Nitrate	4	0	0.00	1.000	0.00
SC-28	Nitrate	7	0	0.00	1.000	0.00
SC-32	Nitrate	7	0	0.00	1.000	0.00
SC-44	Nitrate	6	9	1.50	0.136	0.60
SC-46	Nitrate	9	17	1.67	0.098	0.47
SC-47	Nitrate	9	-11	-1.04	0.308	-0.31
SC-55	Nitrate	9	16	1.56	0.120	0.44
SC-62	Nitrate	6	2	0.19	0.860	0.13
SC-66	Nitrate	7	0	0.00	1.000	0.00
SC-90	Nitrate	8	-4	-0.37	0.720	-0.14
SC-106	Nitrate	8	0	0.00	1.000	0.00
SC-167	Nitrate	8	0	0.00	1.000	0.00

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Shallow Aquifer Zone (continued)						
SC-211	Nitrate	6	-9	-1.50	0.136	-0.60
SC-235	Nitrate	4	4	1.02	0.334	0.67
SC-244	Nitrate	4	-6	-1.70	0.084	-1.00
SC-258	Nitrate	8	5	0.49	0.634	0.18
SC-18	TDS	7	-1	0.00	1.000	-0.05
SC-25	TDS	4	-6	-1.70	0.084	-1.00
SC-32	TDS	7	-9	-1.20	0.238	-0.43
SC-46	TDS	9	-15	-1.46	0.150	-0.42
SC-47	TDS	9	-18	-1.77	0.076	-0.50
SC-62	TDS	6	-6	-0.94	0.370	-0.40
SC-66	TDS	7	-4	-0.45	0.666	-0.19
SC-106	TDS	8	0	0.00	1.000	0.00
SC-167	TDS	9	-9	-0.83	0.416	-0.25
SC-211	TDS	6	5	0.75	0.470	0.33
SC-235	TDS	4	4	1.02	0.334	0.67
S-270	TDS	7	5	0.60	0.562	0.24
S-271	TDS	7	7	0.90	0.382	0.33
S-272	TDS	7	-13	-1.80	0.070	-0.62
S-273	TDS	7	-7	-0.90	0.382	-0.33
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone						
SC-1	Chloride	8	1	0.00	1.000	0.04
SC-118	Chloride	4	2	0.34	0.750	0.33
SC-122	Chloride	4	-4	-1.02	0.334	-0.67
SC-11	Chloride	5	5	0.98	0.358	0.50
SC-124	Chloride	4	2	0.34	0.750	0.33
SC-125	Chloride	4	4	1.02	0.334	0.67
SC-127	Chloride	4	-2	-0.34	0.750	-0.33
SC-128	Chloride	4	2	0.34	0.750	0.33
SC-129	Chloride	4	-2	-0.34	0.750	-0.33
SC-130	Chloride	5	-4	-0.73	0.484	-0.40
SC-131	Chloride	4	3	0.68	0.542	0.50
SC-132	Chloride	4	6	1.70	0.084	1.00
SC-133	Chloride	4	-2	-0.34	0.750	-0.33
SC-134	Chloride	4	5	1.36	0.208	0.83
SC-137	Chloride	4	4	1.02	0.334	0.67
SC-141	Chloride	4	0	0.00	1.000	0.00
SC-142	Chloride	6	2	0.19	0.860	0.13
SC-143	Chloride	4	0	0.00	1.000	0.00

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-147	Chloride	4	2	0.34	0.750	0.33
SC-148	Chloride	4	5	1.36	0.208	0.83
SC-149	Chloride	4	6	1.70	0.084	1.00
SC-151	Chloride	4	2	0.34	0.750	0.33
SC-152	Chloride	4	0	0.00	1.000	0.00
SC-158	Chloride	4	-2	-0.34	0.750	-0.33
SC-159	Chloride	4	2	0.34	0.750	0.33
SC-164	Chloride	4	4	1.02	0.334	0.67
SC-165	Chloride	5	-6	-1.22	0.234	-0.60
SC-166	Chloride	5	-4	-0.73	0.484	-0.40
SC-170	Chloride	4	4	1.02	0.334	0.67
SC-174	Chloride	4	5	1.36	0.208	0.83
SC-15	Chloride	6	-3	-0.38	0.720	-0.20
SC-176	Chloride	4	-6	-1.70	0.084	-1.00
SC-179	Chloride	4	-4	-1.02	0.334	-0.67
SC-181	Chloride	4	-2	-0.34	0.750	-0.33
SC-183	Chloride	4	-4	-1.02	0.334	-0.67
SC-185	Chloride	4	3	0.68	0.542	0.50
SC-190	Chloride	6	-5	-0.75	0.470	-0.33
SC-17	Chloride	4	-1	0.00	1.000	-0.17
SC-197	Chloride	4	4	1.02	0.334	0.67
SC-198	Chloride	4	-3	-0.68	0.542	-0.50
SC-199	Chloride	5	-3	-0.49	0.650	-0.30
SC-200	Chloride	4	-1	0.00	1.000	-0.17
SC-201	Chloride	6	-3	-0.38	0.720	-0.20
SC-19	Chloride	7	6	0.75	0.472	0.29
SC-206	Chloride	5	2	0.24	0.816	0.20
SC-207	Chloride	4	0	0.00	1.000	0.00
SC-208	Chloride	5	-4	-0.73	0.484	-0.40
SC-210	Chloride	7	9	1.20	0.238	0.43
SC-212	Chloride	5	9	1.96	0.050	0.90
SC-262	Chloride	4	6	1.70	0.084	1.00
SC-213	Chloride	4	3	0.68	0.542	0.50
SC-20	Chloride	7	6	0.75	0.472	0.29
SC-217	Chloride	4	4	1.02	0.334	0.67
SC-223	Chloride	4	-6	-1.70	0.084	-1.00
SC-23	Chloride	8	7	0.74	0.472	0.25
SC-226	Chloride	6	-3	-0.38	0.720	-0.20
SC-232	Chloride	7	5	0.60	0.562	0.24
SC-26	Chloride	5	1	0.00	1.000	0.10
SC-239	Chloride	6	2	0.19	0.860	0.13

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-241	Chloride	4	-1	0.00	1.000	-0.17
SC-245	Chloride	4	4	1.02	0.334	0.67
SC-246	Chloride	5	4	0.73	0.484	0.40
SC-247	Chloride	4	6	1.70	0.084	1.00
SC-249	Chloride	5	5	0.98	0.358	0.50
SC-250	Chloride	4	3	0.68	0.542	0.50
SC-254	Chloride	8	16	1.86	0.062	0.57
SC-256	Chloride	4	6	1.70	0.084	1.00
SC-33	Chloride	4	3	0.68	0.542	0.50
SC-34	Chloride	4	5	1.36	0.208	0.83
SC-37	Chloride	5	-3	-0.49	0.650	-0.30
SC-38	Chloride	4	0	0.00	1.000	0.00
SC-39	Chloride	6	-7	-1.13	0.272	-0.47
SC-3	Chloride	4	-4	-1.02	0.334	-0.67
SC-40	Chloride	6	0	0.00	1.000	0.00
SC-41	Chloride	4	-3	-0.68	0.542	-0.50
SC-45	Chloride	6	10	1.69	0.096	0.67
SC-48	Chloride	7	5	0.60	0.562	0.24
SC-4	Chloride	4	-4	-1.02	0.334	-0.67
SC-53	Chloride	4	-2	-0.34	0.750	-0.33
SC-54	Chloride	5	2	0.24	0.816	0.20
SC-57	Chloride	4	-6	-1.70	0.084	-1.00
SC-60	Chloride	4	6	1.70	0.084	1.00
SC-61	Chloride	6	3	0.38	0.720	0.20
SC-63	Chloride	5	7	1.47	0.158	0.70
SC-5	Chloride	5	-4	-0.73	0.484	-0.40
SC-6	Chloride	6	6	0.94	0.370	0.40
SC-75	Chloride	6	-1	0.00	1.000	-0.07
SC-78	Chloride	4	2	0.34	0.750	0.33
SC-82	Chloride	4	-2	-0.34	0.750	-0.33
SC-83	Chloride	6	-1	0.00	1.000	-0.07
SC-86	Chloride	4	0	0.00	1.000	0.00
SC-87	Chloride	5	1	0.00	1.000	0.10
SC-88	Chloride	5	-3	-0.49	0.650	-0.30
SC-89	Chloride	5	4	0.73	0.484	0.40
SC-91	Chloride	5	0	0.00	1.000	0.00
SC-93	Chloride	4	-2	-0.34	0.750	-0.33
SC-94	Chloride	4	4	1.02	0.334	0.67
SC-95	Chloride	4	5	1.36	0.208	0.83
SC-101	Chloride	4	3	0.68	0.542	0.50
SC-103	Chloride	4	4	1.02	0.334	0.67

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-104	Chloride	4	4	1.02	0.334	0.67
SC-9	Chloride	5	0	0.00	1.000	0.00
SC-108	Chloride	4	2	0.34	0.750	0.33
SC-109	Chloride	4	2	0.34	0.750	0.33
SC-110	Chloride	4	2	0.34	0.750	0.33
SC-1	Nitrate	10	0	0.00	1.000	0.00
SC-10	Nitrate	10	-17	-1.43	0.156	-0.38
SC-116	Nitrate	6	3	0.38	0.720	0.20
SC-117	Nitrate	11	23	1.71	0.086	0.42
SC-118	Nitrate	10	17	1.43	0.156	0.38
SC-119	Nitrate	6	9	1.50	0.136	0.60
S-266	Nitrate	4	5	1.36	0.208	0.83
S-267	Nitrate	4	3	0.68	0.542	0.50
SC-120	Nitrate	9	9	0.83	0.416	0.25
SC-121	Nitrate	10	2	0.09	0.930	0.04
SC-122	Nitrate	10	2	0.09	0.930	0.04
SC-123	Nitrate	8	10	1.11	0.276	0.36
SC-11	Nitrate	9	8	0.73	0.476	0.22
SC-124	Nitrate	4	-2	-0.34	0.750	-0.33
SC-126	Nitrate	10	3	0.18	0.862	0.07
SC-127	Nitrate	11	-1	0.00	1.000	-0.02
SC-128	Nitrate	10	3	0.18	0.862	0.07
SC-129	Nitrate	10	-12	-0.98	0.336	-0.27
SC-130	Nitrate	11	-3	-0.16	0.880	-0.05
SC-131	Nitrate	7	3	0.30	0.772	0.14
SC-132	Nitrate	6	8	1.32	0.204	0.53
SC-133	Nitrate	5	-7	-1.47	0.158	-0.70
SC-134	Nitrate	8	-14	-1.61	0.108	-0.50
S-268	Nitrate	4	-4	-1.02	0.334	-0.67
SC-135	Nitrate	6	-8	-1.32	0.204	-0.53
SC-136	Nitrate	8	10	1.11	0.276	0.36
SC-137	Nitrate	7	11	1.50	0.136	0.52
SC-138	Nitrate	6	11	1.88	0.056	0.73
SC-141	Nitrate	39	-19	-0.22	0.828	-0.03
SC-142	Nitrate	26	-66	-1.43	0.152	-0.20
SC-143	Nitrate	11	15	1.09	0.282	0.27
S-263	Nitrate	4	4	1.02	0.334	0.67
SC-144	Nitrate	4	-1	0.00	1.000	-0.17
SC-145	Nitrate	12	17	1.10	0.280	0.26
SC-146	Nitrate	4	-1	0.00	1.000	-0.17
SC-147	Nitrate	10	8	0.63	0.542	0.18

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-148	Nitrate	6	9	1.50	0.136	0.60
SC-149	Nitrate	7	4	0.45	0.666	0.19
SC-150	Nitrate	6	-8	-1.32	0.204	-0.53
SC-151	Nitrate	8	-4	-0.37	0.720	-0.14
SC-152	Nitrate	10	4	0.27	0.794	0.09
SC-153	Nitrate	10	10	0.80	0.432	0.22
SC-13	Nitrate	5	2	0.24	0.816	0.20
SC-154	Nitrate	6	11	1.88	0.056	0.73
SC-156	Nitrate	6	3	0.38	0.720	0.20
SC-157	Nitrate	8	6	0.62	0.548	0.21
SC-158	Nitrate	9	19	1.88	0.060	0.53
SC-159	Nitrate	12	19	1.23	0.222	0.29
SC-160	Nitrate	10	6	0.45	0.664	0.13
SC-161	Nitrate	8	15	1.73	0.084	0.54
SC-162	Nitrate	5	6	1.22	0.234	0.60
SC-163	Nitrate	6	-8	-1.32	0.204	-0.53
SC-14	Nitrate	5	-2	-0.24	0.816	-0.20
SC-165	Nitrate	5	-4	-0.73	0.484	-0.40
SC-166	Nitrate	4	-6	-1.70	0.084	-1.00
SC-168	Nitrate	11	-3	-0.16	0.880	-0.05
SC-170	Nitrate	21	-19	-0.54	0.590	-0.09
SC-171	Nitrate	7	7	0.90	0.382	0.33
SC-172	Nitrate	5	-7	-1.47	0.158	-0.70
SC-15	Nitrate	13	-4	-0.18	0.858	-0.05
SC-175	Nitrate	11	-6	-0.39	0.704	-0.11
SC-176	Nitrate	9	-1	0.00	1.000	-0.03
SC-178	Nitrate	7	-5	-0.60	0.562	-0.24
SC-179	Nitrate	9	-12	-1.15	0.260	-0.33
SC-180	Nitrate	9	-2	-0.10	0.920	-0.06
SC-181	Nitrate	9	-3	-0.21	0.840	-0.08
SC-182	Nitrate	11	-7	-0.47	0.648	-0.13
SC-183	Nitrate	9	-12	-1.15	0.260	-0.33
SC-184	Nitrate	9	1	0.00	1.000	0.03
SC-16	Nitrate	36	-21	-0.27	0.786	-0.03
SC-185	Nitrate	9	-17	-1.67	0.098	-0.47
SC-186	Nitrate	13	-16	-0.92	0.368	-0.21
SC-187	Nitrate	6	-6	-0.94	0.370	-0.40
SC-188	Nitrate	7	-2	-0.15	0.886	-0.10
SC-189	Nitrate	4	-5	-1.36	0.208	-0.83
SC-190	Nitrate	13	-27	-1.59	0.114	-0.35
SC-191	Nitrate	10	4	0.27	0.794	0.09

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-192	Nitrate	5	-4	-0.73	0.484	-0.40
SC-193	Nitrate	8	14	1.61	0.108	0.50
SC-194	Nitrate	10	20	1.70	0.090	0.44
SC-17	Nitrate	9	6	0.52	0.612	0.17
SC-195	Nitrate	6	-5	-0.75	0.470	-0.33
SC-196	Nitrate	4	5	1.36	0.208	0.83
SC-197	Nitrate	4	0	0.00	1.000	0.00
SC-198	Nitrate	4	4	1.02	0.334	0.67
SC-199	Nitrate	5	-1	0.00	1.000	-0.10
SC-200	Nitrate	10	14	1.16	0.254	0.31
SC-201	Nitrate	13	-14	-0.79	0.436	-0.18
SC-202	Nitrate	11	9	0.62	0.542	0.16
SC-203	Nitrate	9	0	0.00	1.000	0.00
SC-204	Nitrate	10	-7	-0.54	0.600	-0.16
SC-206	Nitrate	5	-4	-0.73	0.484	-0.40
SC-207	Nitrate	4	-3	-0.68	0.542	-0.50
SC-208	Nitrate	5	4	0.73	0.484	0.40
S-269	Nitrate	3	0	0.00	1.000	0.00
SC-210	Nitrate	7	0	0.00	1.000	0.00
SC-212	Nitrate	5	6	1.22	0.234	0.60
SC-262	Nitrate	4	4	1.02	0.334	0.67
SC-214	Nitrate	10	11	0.89	0.380	0.24
SC-215	Nitrate	10	13	1.07	0.292	0.29
SC-2	Nitrate	5	-2	-0.24	0.816	-0.20
SC-216	Nitrate	38	28	0.34	0.736	0.04
SC-217	Nitrate	36	6	0.07	0.946	0.01
SC-218	Nitrate	10	7	0.54	0.600	0.16
SC-219	Nitrate	19	-21	-0.70	0.490	-0.12
SC-220	Nitrate	20	-35	-1.10	0.274	-0.18
SC-223	Nitrate	22	9	0.23	0.824	0.04
SC-224	Nitrate	10	12	0.98	0.336	0.27
SC-225	Nitrate	20	-55	-1.75	0.080	-0.29
SC-23	Nitrate	6	3	0.38	0.720	0.20
SC-226	Nitrate	23	-28	-0.71	0.480	-0.11
SC-227	Nitrate	23	1	0.00	1.000	0.00
SC-228	Nitrate	28	68	1.32	0.188	0.18
SC-229	Nitrate	9	-2	-0.10	0.920	-0.06
SC-230	Nitrate	11	21	1.56	0.120	0.38
SC-231	Nitrate	8	-13	-1.48	0.142	-0.46
SC-232	Nitrate	7	3	0.30	0.772	0.14
SC-233	Nitrate	10	12	0.98	0.336	0.27

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-234	Nitrate	8	5	0.49	0.634	0.18
SC-236	Nitrate	7	-14	-1.95	0.050	-0.67
SC-239	Nitrate	6	5	0.75	0.470	0.33
SC-240	Nitrate	8	-12	-1.36	0.178	-0.43
SC-241	Nitrate	9	-14	-1.36	0.180	-0.39
SC-242	Nitrate	9	-18	-1.77	0.076	-0.50
SC-243	Nitrate	9	7	0.63	0.544	0.19
SC-245	Nitrate	10	-22	-1.88	0.058	-0.49
SC-247	Nitrate	10	-14	-1.16	0.254	-0.31
SC-248	Nitrate	7	-7	-0.90	0.382	-0.33
SC-249	Nitrate	11	-23	-1.71	0.086	-0.42
SC-252	Nitrate	8	-8	-0.87	0.398	-0.29
SC-254	Nitrate	8	0	0.00	1.000	0.00
SC-256	Nitrate	10	-17	-1.43	0.156	-0.38
SC-257	Nitrate	9	-10	-0.94	0.358	-0.28
SC-259	Nitrate	8	-13	-1.48	0.142	-0.46
S-264	Nitrate	4	0	0.00	1.000	0.00
SC-260	Nitrate	9	-9	-0.83	0.416	-0.25
SC-33	Nitrate	4	-5	-1.36	0.208	-0.83
SC-34	Nitrate	8	-9	-0.99	0.336	-0.32
SC-37	Nitrate	4	0	0.00	1.000	0.00
SC-39	Nitrate	5	-4	-0.73	0.484	-0.40
SC-3	Nitrate	4	0	0.00	1.000	0.00
SC-40	Nitrate	5	0	0.00	1.000	0.00
SC-41	Nitrate	5	-5	-0.98	0.358	-0.50
SC-43	Nitrate	5	-9	-1.96	0.050	-0.90
SC-45	Nitrate	6	0	0.00	1.000	0.00
SC-48	Nitrate	29	66	1.22	0.224	0.16
SC-49	Nitrate	10	-5	-0.36	0.728	-0.11
SC-262	Nitrate	8	3	0.25	0.812	0.11
SC-4	Nitrate	4	-1	0.00	1.000	-0.17
SC-57	Nitrate	12	14	0.89	0.380	0.21
SC-58	Nitrate	10	22	1.88	0.058	0.49
SC-59	Nitrate	11	-17	-1.25	0.218	-0.31
SC-60	Nitrate	20	37	1.17	0.246	0.19
SC-61	Nitrate	10	17	1.43	0.156	0.38
SC-5	Nitrate	5	0	0.00	1.000	0.00
SC-64	Nitrate	4	6	1.70	0.084	1.00
SC-65	Nitrate	23	-39	-1.00	0.320	-0.15
SC-67	Nitrate	5	0	0.00	1.000	0.00
SC-68	Nitrate	7	-1	0.00	1.000	-0.05

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-69	Nitrate	6	-5	-0.75	0.470	-0.33
SC-71	Nitrate	35	-115	-1.62	0.106	-0.19
SC-72	Nitrate	6	4	0.56	0.594	0.27
SC-73	Nitrate	4	0	0.00	1.000	0.00
SC-74	Nitrate	5	0	0.00	1.000	0.00
SC-6	Nitrate	6	3	0.38	0.720	0.20
SC-75	Nitrate	12	-29	-1.92	0.052	-0.44
SC-76	Nitrate	9	0	0.00	1.000	0.00
SC-77	Nitrate	5	2	0.24	0.816	0.20
SC-78	Nitrate	15	20	0.94	0.354	0.19
SC-79	Nitrate	10	21	1.79	0.072	0.47
SC-80	Nitrate	6	5	0.75	0.470	0.33
SC-82	Nitrate	7	10	1.35	0.186	0.48
SC-83	Nitrate	8	16	1.86	0.062	0.57
SC-84	Nitrate	7	7	0.90	0.382	0.33
SC-7	Nitrate	10	9	0.72	0.484	0.20
SC-85	Nitrate	6	7	1.13	0.272	0.47
SC-86	Nitrate	4	0	0.00	1.000	0.00
SC-87	Nitrate	5	2	0.24	0.816	0.20
SC-88	Nitrate	5	4	0.73	0.484	0.40
SC-89	Nitrate	6	9	1.50	0.136	0.60
SC-92	Nitrate	7	13	1.80	0.070	0.62
SC-93	Nitrate	9	12	1.15	0.260	0.33
SC-94	Nitrate	17	26	1.03	0.308	0.19
SC-95	Nitrate	10	-21	-1.79	0.072	-0.47
SC-8	Nitrate	7	-3	-0.30	0.772	-0.14
SC-96	Nitrate	9	6	0.52	0.612	0.17
S-265	Nitrate	4	6	1.70	0.084	1.00
SC-98	Nitrate	17	18	0.70	0.490	0.13
SC-99	Nitrate	9	4	0.31	0.762	0.11
SC-100	Nitrate	13	18	1.04	0.306	0.23
SC-102	Nitrate	27	-74	-1.52	0.128	-0.21
SC-103	Nitrate	11	20	1.48	0.142	0.36
SC-9	Nitrate	8	8	0.87	0.398	0.29
SC-105	Nitrate	35	79	1.11	0.270	0.13
SC-108	Nitrate	4	2	0.34	0.750	0.33
SC-109	Nitrate	4	-2	-0.34	0.750	-0.33
SC-110	Nitrate	4	2	0.34	0.750	0.33
SC-111	Nitrate	6	3	0.38	0.720	0.20
SC-112	Nitrate	5	-8	-1.71	0.084	-0.80
SC-113	Nitrate	8	-2	-0.12	0.904	-0.07

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-115	Nitrate	6	1	0.00	1.000	0.07
SC-1	TDS	5	-2	-0.24	0.816	-0.20
SC-118	TDS	4	4	1.02	0.334	0.67
SC-122	TDS	4	2	0.34	0.750	0.33
SC-11	TDS	5	1	0.00	1.000	0.10
SC-124	TDS	4	-6	-1.70	0.084	-1.00
SC-125	TDS	4	0	0.00	1.000	0.00
SC-127	TDS	4	2	0.34	0.750	0.33
SC-128	TDS	4	2	0.34	0.750	0.33
SC-129	TDS	4	-2	-0.34	0.750	-0.33
SC-130	TDS	5	8	1.71	0.084	0.80
SC-131	TDS	4	1	0.00	1.000	0.17
SC-132	TDS	4	1	0.00	1.000	0.17
SC-133	TDS	4	0	0.00	1.000	0.00
SC-134	TDS	4	-1	0.00	1.000	-0.17
SC-137	TDS	4	0	0.00	1.000	0.00
SC-141	TDS	4	-1	0.00	1.000	-0.17
SC-142	TDS	6	0	0.00	1.000	0.00
SC-143	TDS	4	4	1.02	0.334	0.67
SC-147	TDS	4	0	0.00	1.000	0.00
SC-148	TDS	4	3	0.68	0.542	0.50
SC-149	TDS	4	0	0.00	1.000	0.00
SC-151	TDS	4	6	1.70	0.084	1.00
SC-152	TDS	4	0	0.00	1.000	0.00
SC-158	TDS	4	4	1.02	0.334	0.67
SC-159	TDS	4	-2	-0.34	0.750	-0.33
SC-164	TDS	4	-1	0.00	1.000	-0.17
SC-166	TDS	5	2	0.24	0.816	0.20
SC-170	TDS	4	2	0.34	0.750	0.33
SC-174	TDS	4	5	1.36	0.208	0.83
SC-15	TDS	6	-9	-1.50	0.136	-0.60
SC-176	TDS	4	-2	-0.34	0.750	-0.33
SC-179	TDS	4	2	0.34	0.750	0.33
SC-181	TDS	4	4	1.02	0.334	0.67
SC-183	TDS	4	0	0.00	1.000	0.00
SC-185	TDS	4	0	0.00	1.000	0.00
SC-190	TDS	6	0	0.00	1.000	0.00
SC-17	TDS	4	-6	-1.70	0.084	-1.00
SC-197	TDS	4	-2	-0.34	0.750	-0.33
SC-198	TDS	4	2	0.34	0.750	0.33
SC-199	TDS	5	-4	-0.73	0.484	-0.40

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-200	TDS	4	6	1.70	0.084	1.00
SC-201	TDS	6	1	0.00	1.000	0.07
SC-206	TDS	5	0	0.00	1.000	0.00
SC-207	TDS	4	2	0.34	0.750	0.33
SC-208	TDS	5	6	1.22	0.234	0.60
SC-210	TDS	7	-2	-0.15	0.886	-0.10
SC-212	TDS	5	0	0.00	1.000	0.00
SC-262	TDS	4	2	0.34	0.750	0.33
SC-213	TDS	4	2	0.34	0.750	0.33
SC-217	TDS	4	-4	-1.02	0.334	-0.67
SC-223	TDS	4	-2	-0.34	0.750	-0.33
SC-23	TDS	6	11	1.88	0.056	0.73
SC-226	TDS	6	-2	-0.19	0.860	-0.13
SC-232	TDS	7	3	0.30	0.772	0.14
SC-26	TDS	5	-9	-1.96	0.050	-0.90
SC-241	TDS	4	-3	-0.68	0.542	-0.50
SC-245	TDS	4	-4	-1.02	0.334	-0.67
SC-246	TDS	5	-9	-1.96	0.050	-0.90
SC-247	TDS	4	-4	-1.02	0.334	-0.67
SC-30	TDS	6	-11	-1.88	0.056	-0.73
SC-249	TDS	5	-5	-0.98	0.358	-0.50
SC-250	TDS	4	-6	-1.70	0.084	-1.00
SC-254	TDS	8	13	1.48	0.142	0.46
SC-256	TDS	4	0	0.00	1.000	0.00
SC-33	TDS	4	2	0.34	0.750	0.33
SC-34	TDS	4	1	0.00	1.000	0.17
SC-37	TDS	5	-8	-1.71	0.084	-0.80
SC-38	TDS	4	-6	-1.70	0.084	-1.00
SC-39	TDS	6	-7	-1.13	0.272	-0.47
SC-3	TDS	4	-4	-1.02	0.334	-0.67
SC-40	TDS	6	-10	-1.69	0.096	-0.67
SC-41	TDS	4	-2	-0.34	0.750	-0.33
SC-45	TDS	6	-3	-0.38	0.720	-0.20
SC-48	TDS	6	-1	0.00	1.000	-0.07
SC-51	TDS	8	-12	-1.36	0.178	-0.43
SC-4	TDS	4	-6	-1.70	0.084	-1.00
SC-52	TDS	4	5	1.36	0.208	0.83
SC-53	TDS	4	-6	-1.70	0.084	-1.00
SC-54	TDS	5	5	0.98	0.358	0.50
SC-56	TDS	4	4	1.02	0.334	0.67
SC-57	TDS	4	-3	-0.68	0.542	-0.50

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin - Santa Clara Plain, Principal Aquifer Zone (continued)						
SC-60	TDS	4	2	0.34	0.750	0.33
SC-61	TDS	6	5	0.75	0.470	0.33
SC-63	TDS	5	5	0.98	0.358	0.50
SC-5	TDS	5	-3	-0.49	0.650	-0.30
SC-6	TDS	6	5	0.75	0.470	0.33
SC-75	TDS	6	-4	-0.56	0.594	-0.27
SC-78	TDS	4	-1	0.00	1.000	-0.17
SC-82	TDS	4	-4	-1.02	0.334	-0.67
SC-83	TDS	6	-9	-1.50	0.136	-0.60
SC-86	TDS	4	2	0.34	0.750	0.33
SC-87	TDS	5	4	0.73	0.484	0.40
SC-88	TDS	5	4	0.73	0.484	0.40
SC-89	TDS	6	7	1.13	0.272	0.47
SC-91	TDS	5	6	1.22	0.234	0.60
SC-93	TDS	4	-2	-0.34	0.750	-0.33
SC-94	TDS	4	5	1.36	0.208	0.83
SC-95	TDS	4	-6	-1.70	0.084	-1.00
SC-101	TDS	4	2	0.34	0.750	0.33
SC-103	TDS	4	-4	-1.02	0.334	-0.67
SC-104	TDS	4	4	1.02	0.334	0.67
SC-9	TDS	5	-6	-1.22	0.234	-0.60
SC-107	TDS	5	6	1.22	0.234	0.60
SC-108	TDS	4	0	0.00	1.000	0.00
SC-109	TDS	4	0	0.00	1.000	0.00
SC-110	TDS	4	0	0.00	1.000	0.00
Santa Clara Subbasin – Coyote Valley						
C-28	Chloride	4	3	0.68	0.542	0.50
C-9	Chloride	6	3	0.38	0.720	0.20
C-10	Chloride	6	11	1.88	0.056	0.73
C-13	Chloride	7	0	0.00	1.000	0.00
C-16	Chloride	9	8	0.73	0.476	0.22
C-27	Chloride	4	6	1.70	0.084	1.00
C-18	Chloride	4	1	0.00	1.000	0.17
C-20	Chloride	4	3	0.68	0.542	0.50
C-21	Chloride	4	-3	-0.68	0.542	-0.50
C-25	Chloride	5	0	0.00	1.000	0.00
C-26	Chloride	6	7	1.13	0.272	0.47
C-22	Chloride	6	4	0.56	0.594	0.27
C-24	Chloride	8	11	1.24	0.226	0.39
C-4	Chloride	4	4	1.02	0.334	0.67

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Santa Clara Subbasin – Coyote Valley (continued)						
C-6	Chloride	6	3	0.38	0.720	0.20
SC-261	Nitrate	8	3	0.25	0.812	0.11
C-8	Nitrate	23	-39	-1.00	0.320	-0.15
C-28	Nitrate	4	0	0.00	1.000	0.00
C-9	Nitrate	6	-11	-1.88	0.056	-0.73
C-11	Nitrate	4	4	1.02	0.334	0.67
C-12	Nitrate	7	1	0.00	1.000	0.05
C-13	Nitrate	7	-1	0.00	1.000	-0.05
C-14	Nitrate	20	-15	-0.45	0.654	-0.08
C-16	Nitrate	10	17	1.43	0.156	0.38
C-27	Nitrate	4	4	1.02	0.334	0.67
C-17	Nitrate	10	13	1.07	0.292	0.29
C-18	Nitrate	10	-21	-1.79	0.072	-0.47
C-20	Nitrate	10	-18	-1.52	0.132	-0.40
C-26	Nitrate	11	-3	-0.16	0.880	-0.05
C-22	Nitrate	6	0	0.00	1.000	0.00
C-23	Nitrate	6	1	0.00	1.000	0.07
C-1	Nitrate	4	-5	-1.36	0.208	-0.83
L-6	Nitrate	7	1	0.00	1.000	0.05
C-2	Nitrate	8	-15	-1.73	0.084	-0.54
C-3	Nitrate	7	4	0.45	0.666	0.19
C-5	Nitrate	8	-10	-1.11	0.276	-0.36
C-7	Nitrate	7	-3	-0.30	0.772	-0.14
C-28	TDS	4	0	0.00	1.000	0.00
C-9	TDS	6	6	0.94	0.370	0.40
C-10	TDS	6	7	1.13	0.272	0.47
C-13	TDS	7	5	0.60	0.562	0.24
C-15	TDS	5	4	0.73	0.484	0.40
C-16	TDS	9	-10	-0.94	0.358	-0.28
C-27	TDS	4	4	1.02	0.334	0.67
C-18	TDS	4	2	0.34	0.750	0.33
C-20	TDS	4	2	0.34	0.750	0.33
C-21	TDS	4	0	0.00	1.000	0.00
C-25	TDS	5	0	0.00	1.000	0.00
C-26	TDS	6	1	0.00	1.000	0.07
C-22	TDS	6	7	1.13	0.272	0.47
C-24	TDS	8	6	0.62	0.548	0.21
C-4	TDS	4	1	0.00	1.000	0.17

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Llagas Subbasin, Shallow Aquifer Zone						
L-4	Chloride	8	8	0.87	0.398	0.29
L-27	Chloride	4	4	1.02	0.334	0.67
L-47	Chloride	4	5	1.36	0.208	0.83
L-53	Chloride	8	10	1.11	0.276	0.36
L-58	Chloride	5	-4	-0.73	0.484	-0.40
L-68	Chloride	7	14	1.95	0.050	0.67
L-70	Chloride	8	4	0.37	0.720	0.14
L-79	Chloride	4	2	0.34	0.750	0.33
L-81	Chloride	9	-17	-1.67	0.098	-0.47
L-101	Chloride	5	-4	-0.73	0.484	-0.40
L-102	Chloride	10	13	1.07	0.292	0.29
L-105	Chloride	10	19	1.61	0.108	0.42
L-106	Chloride	4	0	0.00	1.000	0.00
L-112	Chloride	4	0	0.00	1.000	0.00
L-119	Chloride	7	-2	-0.15	0.886	-0.10
L-15	Nitrate	9	-8	-0.73	0.476	-0.22
L-26	Nitrate	11	-1	0.00	1.000	-0.02
L-27	Nitrate	6	-3	-0.38	0.720	-0.20
L-47	Nitrate	8	0	0.00	1.000	0.00
L-53	Nitrate	8	4	0.37	0.720	0.14
L-57	Nitrate	8	-12	-1.36	0.178	-0.43
L-58	Nitrate	10	19	1.61	0.108	0.42
L-68	Nitrate	9	19	1.88	0.060	0.53
L-70	Nitrate	11	13	0.93	0.358	0.24
L-79	Nitrate	6	7	1.13	0.272	0.47
B-3	Nitrate	9	-11	-1.04	0.308	-0.31
L-82	Nitrate	4	-2	-0.34	0.750	-0.33
L-83	Nitrate	4	-2	-0.34	0.750	-0.33
L-84	Nitrate	11	19	1.40	0.164	0.35
L-101	Nitrate	10	-3	-0.18	0.862	-0.07
L-102	Nitrate	10	9	0.72	0.484	0.20
L-106	Nitrate	4	6	1.70	0.084	1.00
L-112	Nitrate	9	-1	0.00	1.000	-0.03
L-115	Nitrate	6	3	0.38	0.720	0.20
L-116	Nitrate	13	12	0.67	0.510	0.15
L-119	Nitrate	7	-12	-1.65	0.102	-0.57
L-4	TDS	8	10	1.11	0.276	0.36
L-26	TDS	6	-5	-0.75	0.470	-0.33
L-27	TDS	4	3	0.68	0.542	0.50
L-47	TDS	4	0	0.00	1.000	0.00
L-53	TDS	8	13	1.48	0.142	0.46

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Llagas Subbasin, Shallow Aquifer Zone						
L-58	TDS	5	-4	-0.73	0.484	-0.40
L-68	TDS	7	9	1.20	0.238	0.43
L-70	TDS	9	6	0.52	0.612	0.17
L-79	TDS	4	0	0.00	1.000	0.00
L-81	TDS	10	-10	-0.80	0.432	-0.22
L-82	TDS	4	4	1.02	0.334	0.67
L-83	TDS	4	4	1.02	0.334	0.67
L-84	TDS	9	15	1.46	0.150	0.42
L-101	TDS	5	-4	-0.73	0.484	-0.40
L-102	TDS	10	-1	0.00	1.000	-0.02
L-105	TDS	10	1	0.00	1.000	0.02
L-106	TDS	4	-5	-1.36	0.208	-0.83
L-112	TDS	4	4	1.02	0.334	0.67
L-116	TDS	11	14	1.01	0.320	0.25
L-119	TDS	7	-5	-0.60	0.562	-0.24
Llagas Subbasin, Principal Aquifer Zone						
L-3	Chloride	4	4	1.02	0.334	0.67
L-14	Chloride	4	1	0.00	1.000	0.17
L-117	Chloride	6	-1	0.00	1.000	-0.07
L-118	Chloride	7	5	0.60	0.562	0.24
L-20	Chloride	4	0	0.00	1.000	0.00
L-21	Chloride	5	6	1.22	0.234	0.60
L-22	Chloride	6	-5	-0.75	0.470	-0.33
L-23	Chloride	4	-3	-0.68	0.542	-0.50
L-32	Chloride	9	15	1.46	0.150	0.42
L-35	Chloride	8	-3	-0.25	0.812	-0.11
L-7	Chloride	5	2	0.24	0.816	0.20
L-41	Chloride	8	3	0.25	0.812	0.11
L-8	Chloride	4	5	1.36	0.208	0.83
L-44	Chloride	4	1	0.00	1.000	0.17
L-9	Chloride	4	2	0.34	0.750	0.33
L-52	Chloride	4	1	0.00	1.000	0.17
L-55	Chloride	5	1	0.00	1.000	0.10
L-10	Chloride	4	4	1.02	0.334	0.67
L-61	Chloride	4	6	1.70	0.084	1.00
L-62	Chloride	5	6	1.22	0.234	0.60
L-66	Chloride	7	10	1.35	0.186	0.48
L-11	Chloride	4	2	0.34	0.750	0.33
L-71	Chloride	7	4	0.45	0.666	0.19
L-76	Chloride	5	6	1.22	0.234	0.60

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Llagas Subbasin, Principal Aquifer Zone (continued)						
L-80	Chloride	4	-1	0.00	1.000	-0.17
L-12	Chloride	4	0	0.00	1.000	0.00
L-92	Chloride	4	4	1.02	0.334	0.67
L-94	Chloride	5	5	0.98	0.358	0.50
L-13	Chloride	4	-2	-0.34	0.750	-0.33
L-103	Chloride	5	-1	0.00	1.000	-0.10
L-104	Chloride	5	2	0.24	0.816	0.20
L-107	Chloride	7	3	0.30	0.772	0.14
L-108	Chloride	4	4	1.02	0.334	0.67
L-3	Nitrate	10	-19	-1.61	0.108	-0.42
L-14	Nitrate	10	6	0.45	0.664	0.13
L-117	Nitrate	10	-5	-0.36	0.728	-0.11
L-118	Nitrate	7	0	0.00	1.000	0.00
L-16	Nitrate	15	-11	-0.49	0.626	-0.10
L-17	Nitrate	14	1	0.00	1.000	0.01
L-18	Nitrate	10	-20	-1.70	0.090	-0.44
L-19	Nitrate	26	-51	-1.10	0.274	-0.16
L-20	Nitrate	9	-13	-1.25	0.220	-0.36
L-120	Nitrate	7	-7	-0.90	0.382	-0.33
L-121	Nitrate	7	-1	0.00	1.000	-0.05
L-5	Nitrate	9	-15	-1.46	0.150	-0.42
L-24	Nitrate	37	150	1.95	0.050	0.23
L-25	Nitrate	6	-9	-1.50	0.136	-0.60
L-31	Nitrate	9	5	0.42	0.686	0.14
L-32	Nitrate	9	8	0.73	0.476	0.22
L-33	Nitrate	6	-8	-1.32	0.204	-0.53
L-35	Nitrate	8	-10	-1.11	0.276	-0.36
L-36	Nitrate	6	-11	-1.88	0.056	-0.73
L-122	Nitrate	5	0	0.00	1.000	0.00
L-124	Nitrate	7	-1	0.00	1.000	-0.05
L-37	Nitrate	12	11	0.69	0.502	0.17
L-38	Nitrate	4	-3	-0.68	0.542	-0.50
L-39	Nitrate	8	-4	-0.37	0.720	-0.14
L-40	Nitrate	12	-11	-0.69	0.502	-0.17
L-42	Nitrate	10	3	0.18	0.862	0.07
L-44	Nitrate	9	-9	-0.83	0.416	-0.25
L-45	Nitrate	10	-19	-1.61	0.108	-0.42
L-46	Nitrate	8	8	0.87	0.398	0.29
L-125	Nitrate	6	0	0.00	1.000	0.00
L-126	Nitrate	9	-10	-0.94	0.358	-0.28

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Masked Well ID	Parameter	n	S	z	P value	τ
Llagas Subbasin, Principal Aquifer Zone (continued)						
L-127	Nitrate	7	0	0.00	1.000	0.00
L-128	Nitrate	29	-19	-0.34	0.738	-0.05
L-129	Nitrate	32	-71	-1.14	0.258	-0.14
L-9	Nitrate	10	21	1.79	0.072	0.47
L-133	Nitrate	7	-5	-0.60	0.562	-0.24
L-49	Nitrate	7	6	0.75	0.472	0.29
L-50	Nitrate	8	15	1.73	0.084	0.54
L-51	Nitrate	9	-9	-0.83	0.416	-0.25
L-52	Nitrate	8	-14	-1.61	0.108	-0.50
L-54	Nitrate	8	-14	-1.61	0.108	-0.50
L-130	Nitrate	8	0	0.00	1.000	0.00
L-131	Nitrate	6	-6	-0.94	0.370	-0.40
L-132	Nitrate	6	-4	-0.56	0.594	-0.27
L-55	Nitrate	10	-18	-1.52	0.132	-0.40
L-60	Nitrate	12	8	0.48	0.638	0.12
L-62	Nitrate	5	4	0.73	0.484	0.40
L-63	Nitrate	6	5	0.75	0.470	0.33
L-64	Nitrate	7	11	1.50	0.136	0.52
L-66	Nitrate	8	-13	-1.48	0.142	-0.46
L-67	Nitrate	7	7	0.90	0.382	0.33
L-71	Nitrate	7	0	0.00	1.000	0.00
L-72	Nitrate	12	14	0.89	0.380	0.21
L-73	Nitrate	34	-30	-0.43	0.668	-0.05
L-74	Nitrate	8	1	0.00	1.000	0.04
L-75	Nitrate	8	6	0.62	0.548	0.21
L-77	Nitrate	7	-5	-0.60	0.562	-0.24
L-78	Nitrate	33	123	1.89	0.058	0.23
L-12	Nitrate	10	0	0.00	1.000	0.00
L-87	Nitrate	10	15	1.25	0.216	0.33
L-88	Nitrate	32	-26	-0.41	0.688	-0.05
L-89	Nitrate	7	0	0.00	1.000	0.00
L-90	Nitrate	7	0	0.00	1.000	0.00
L-91	Nitrate	7	13	1.80	0.070	0.62
L-92	Nitrate	9	6	0.52	0.612	0.17
L-93	Nitrate	14	-24	-1.26	0.212	-0.26
L-94	Nitrate	34	-79	-1.16	0.250	-0.14
L-95	Nitrate	34	19	0.27	0.792	0.03
L-13	Nitrate	10	4	0.27	0.794	0.09
L-99	Nitrate	8	-1	0.00	1.000	-0.04
L-100	Nitrate	6	-1	0.00	1.000	-0.07
L-103	Nitrate	5	0	0.00	1.000	0.00

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

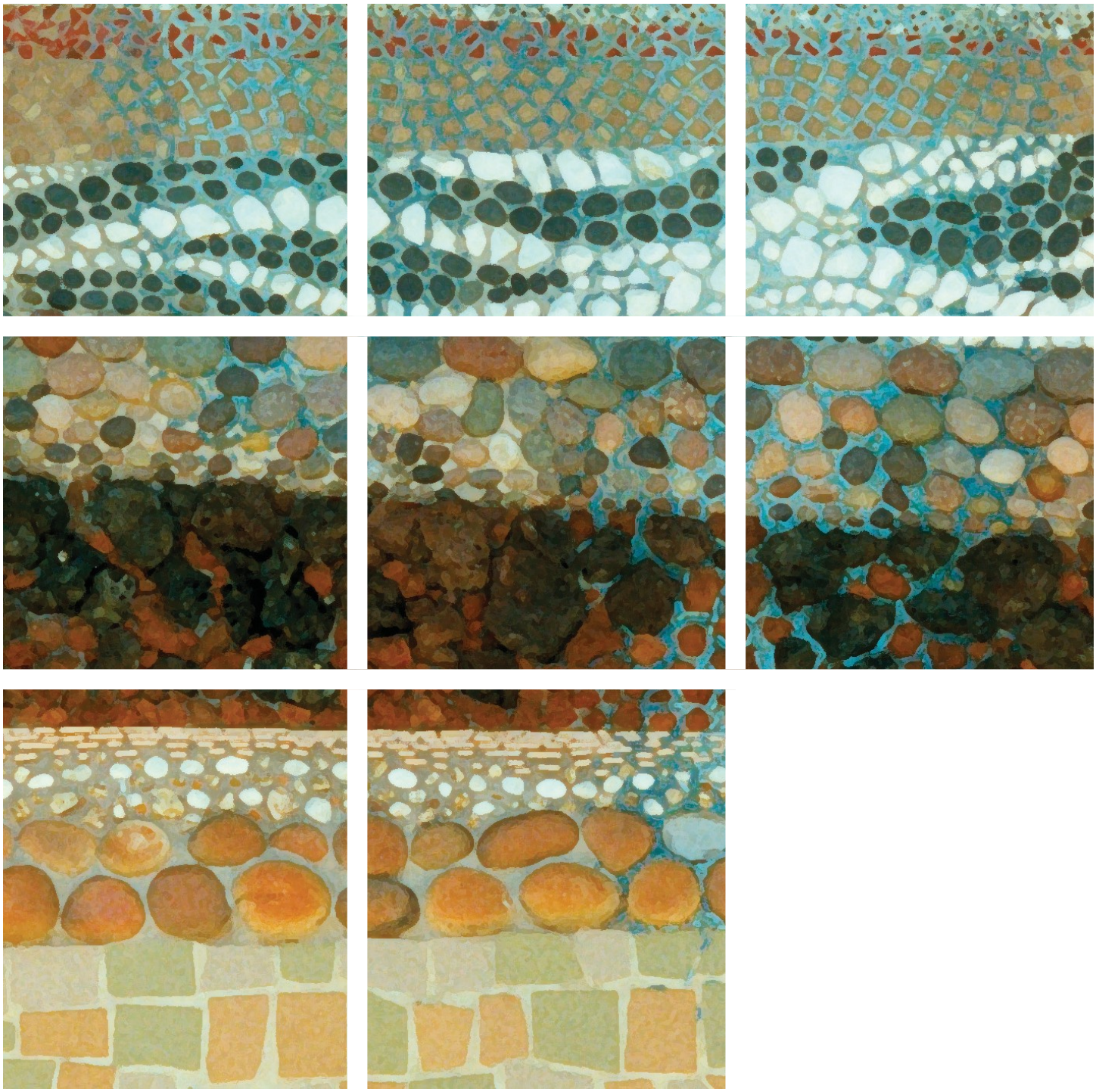
Masked Well ID	Parameter	n	S	z	P value	τ
Llagas Subbasin, Principal Aquifer Zone (continued)						
L-104	Nitrate	11	-7	-0.47	0.648	-0.13
L-107	Nitrate	9	-10	-0.94	0.358	-0.28
L-108	Nitrate	4	4	1.02	0.334	0.67
L-110	Nitrate	9	-4	-0.31	0.762	-0.11
L-111	Nitrate	9	-18	-1.77	0.076	-0.50
L-3	TDS	4	4	1.02	0.334	0.67
L-14	TDS	4	-3	-0.68	0.542	-0.50
L-117	TDS	6	1	0.00	1.000	0.07
L-118	TDS	7	3	0.30	0.772	0.14
L-20	TDS	4	0	0.00	1.000	0.00
L-21	TDS	5	-2	-0.24	0.816	-0.20
L-22	TDS	6	-3	-0.38	0.720	-0.20
L-23	TDS	4	2	0.34	0.750	0.33
L-32	TDS	9	-5	-0.42	0.686	-0.14
L-35	TDS	8	-2	-0.12	0.904	-0.07
L-7	TDS	5	2	0.24	0.816	0.20
L-41	TDS	8	-2	-0.12	0.904	-0.07
L-8	TDS	4	-6	-1.70	0.084	-1.00
L-44	TDS	4	-4	-1.02	0.334	-0.67
L-9	TDS	4	-4	-1.02	0.334	-0.67
L-51	TDS	4	0	0.00	1.000	0.00
L-52	TDS	4	-6	-1.70	0.084	-1.00
L-55	TDS	5	-4	-0.73	0.484	-0.40
L-10	TDS	4	0	0.00	1.000	0.00
L-61	TDS	4	-4	-1.02	0.334	-0.67
L-62	TDS	5	2	0.24	0.816	0.20
L-66	TDS	7	-6	-0.75	0.472	-0.29
L-11	TDS	4	2	0.34	0.750	0.33
L-71	TDS	7	3	0.30	0.772	0.14
L-76	TDS	5	3	0.49	0.650	0.30
L-12	TDS	4	-4	-1.02	0.334	-0.67
L-92	TDS	4	-2	-0.34	0.750	-0.33
L-94	TDS	5	8	1.71	0.084	0.80
L-13	TDS	4	2	0.34	0.750	0.33
L-103	TDS	5	1	0.00	1.000	0.10
L-104	TDS	5	0	0.00	1.000	0.00
L-107	TDS	7	5	0.60	0.562	0.24
L-108	TDS	4	4	1.02	0.334	0.67

Notes:
n = number of data records; S = Mann-Kendall test statistic; z = Mann-Kendall statistic (S) converted to test statistic that is approximated by a normal distribution; p value = probability of getting the observed value of τ or one more extreme, when the null hypothesis is true; τ =Kendall's tau (correlation coefficient); Magnitude of trend is the median slope of all pair-wise slopes

Santa Clara Valley Water District

5750 Almaden Expressway, San Jose, CA 95118

(408) 265-2600 | www.valleywater.org



© 2012 Santa Clara Valley Water District - June, 2012